WORK

An Illustrated Magazine of Practice and Theory

FOR ALL WORKMEN, PROFESSIONAL AND AMATEUR.

[*All Rights reserved.*]

VOL. I.—No. 17.] SATURDAY, JULY 13, 1889. [PRICE ONE PENNY.

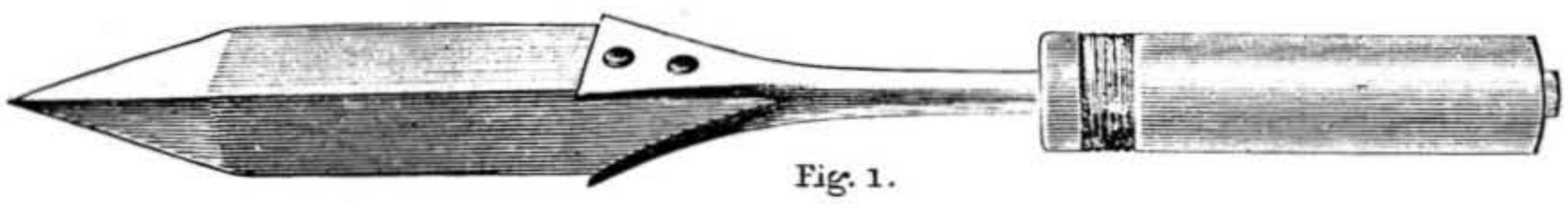


Fig. 1.

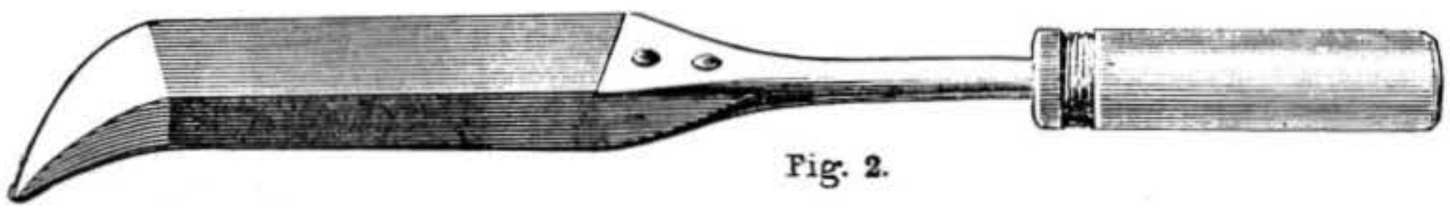


Fig. 2.

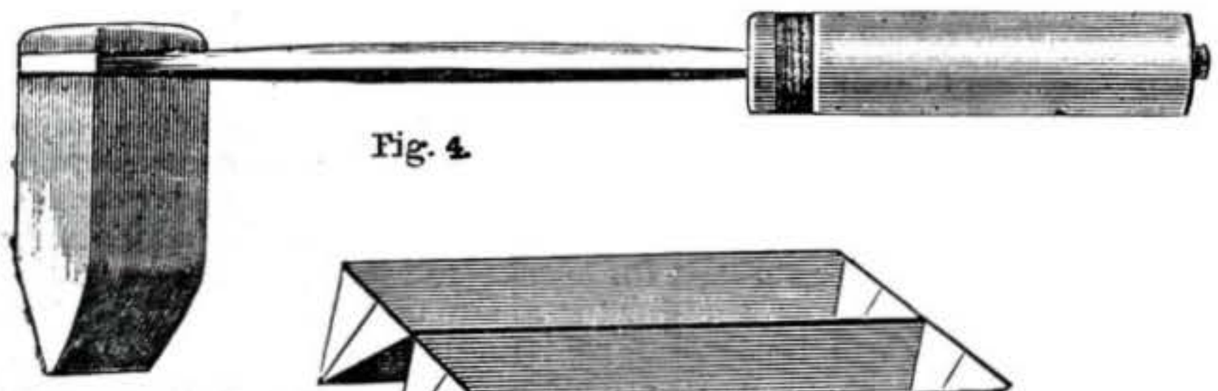


Fig. 4.

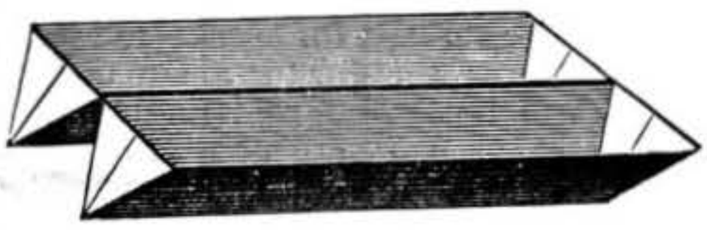


Fig. 5.

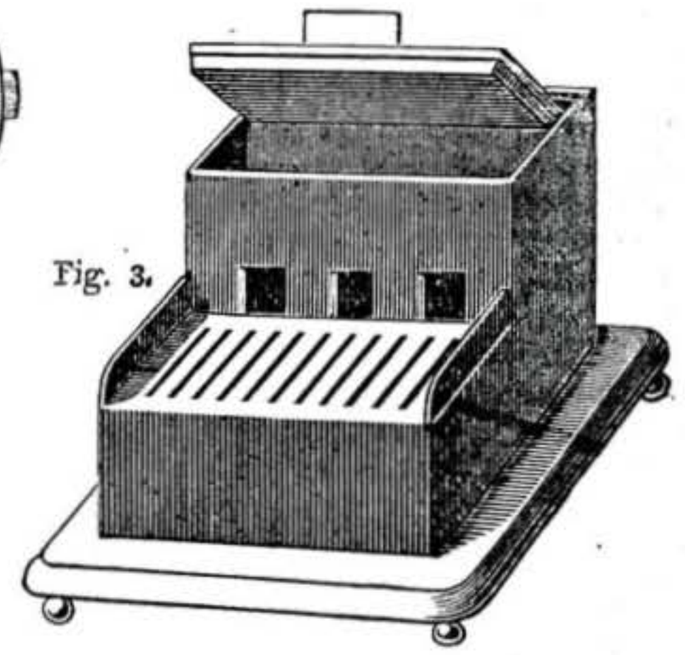


Fig. 3.

Fig. 6.

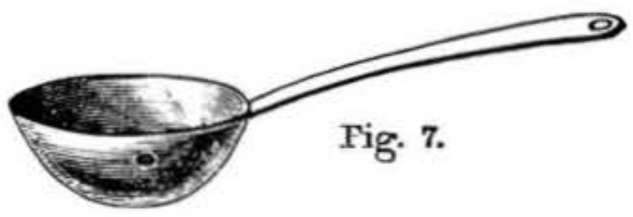


Fig. 7.

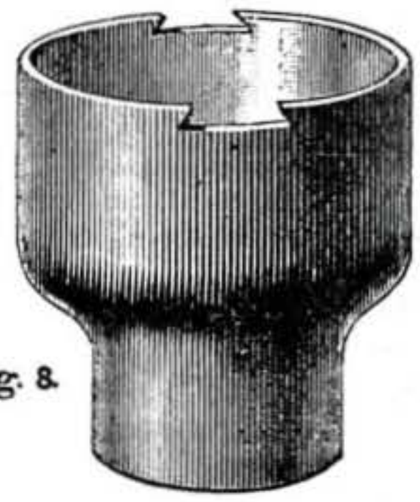


Fig. 8.

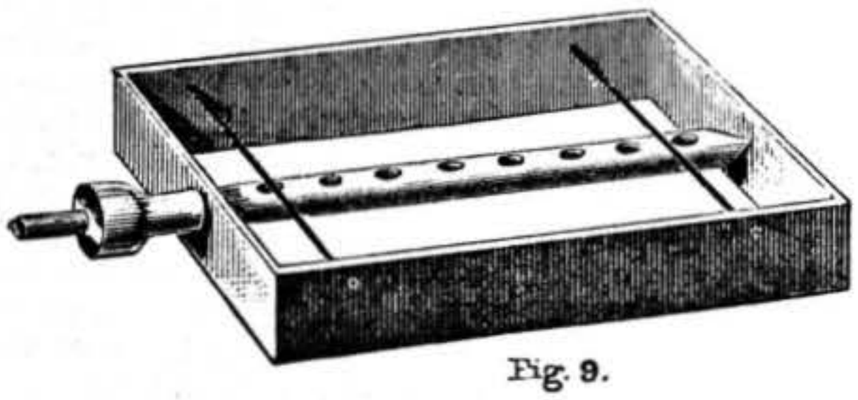


Fig. 9.

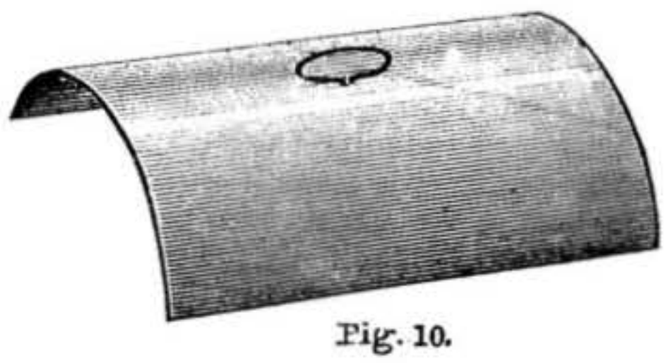


Fig. 10.

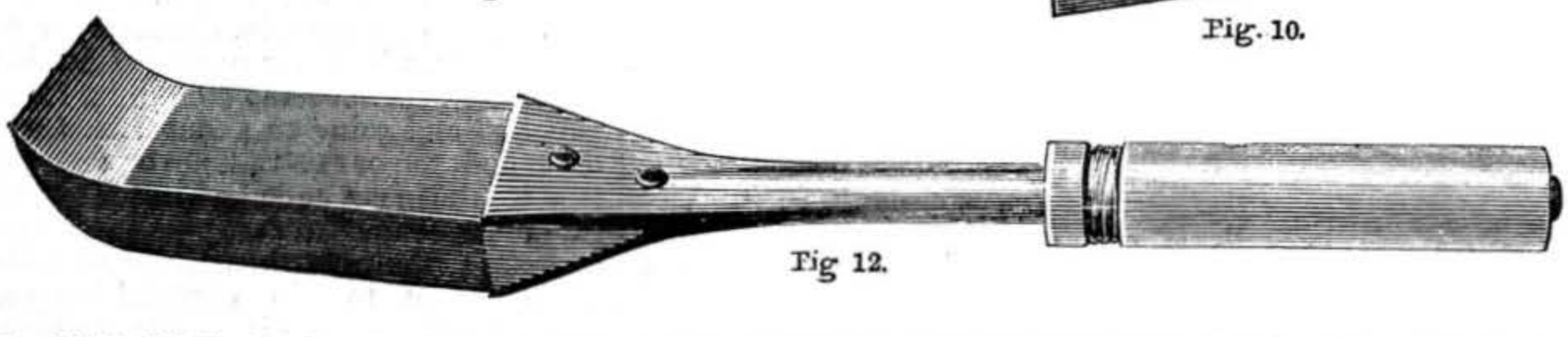


Fig 12.

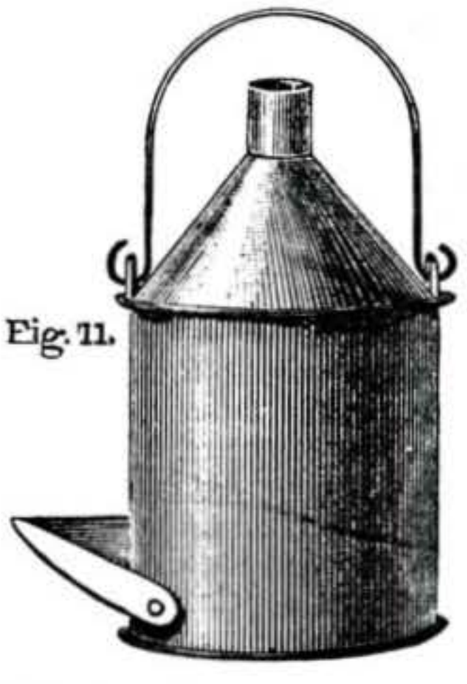


Fig. 11.

Fig. 1.—Pointed Soldering Iron for General Work. Fig. 2.—Soldering Iron with Bent Point. Fig. 3.—Stove suitable for Soldering. Fig. 4.—Hatchet Bit. Fig. 5.—Mould for Solder. Fig. 6.—Brass to fit across Air Bulb. Fig. 7.—Ladle for Melting and Running Solder. Fig. 8.—Air Bulb. Fig. 9.—Home-made Gas Stove. Fig. 10.—Cover for Gas Stove. Fig. 11.—Sheet Iron Fire-Pot for Outdoor Work. Fig. 12.—Bottoming Iron.

SOLDERING:

THE NECESSARY APPLIANCES AND MATERIALS.

BY ROBERT ALEXANDER.

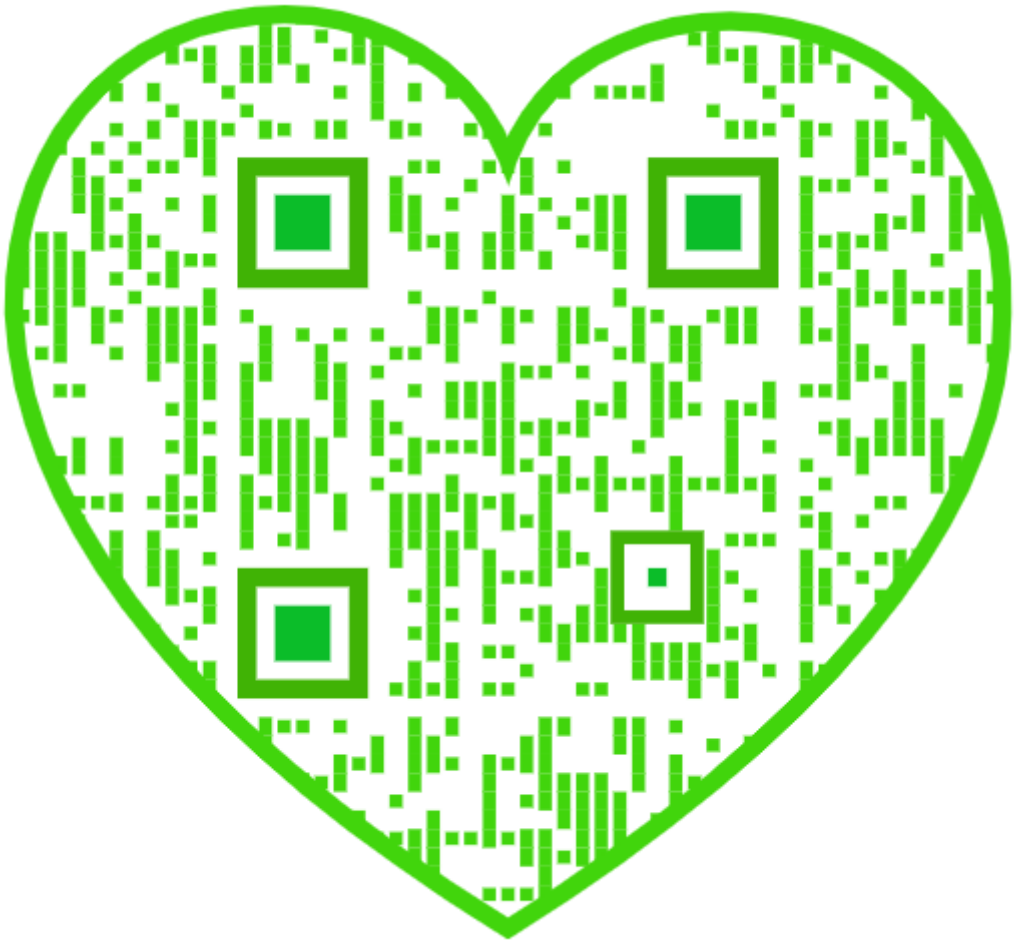
INTRODUCTORY—DEFINITION OF SOLDERING—SOLDERING IRONS—THEIR LENGTH, ETC.—THE SOLDER LADLE—MAKING SOLDER—TEST FOR SOLDER—FIRE OR STOVE—FUEL—GAS STOVE—HOME-MADE STOVE—FLUXES FOR SOLDERING—HYDROCHLORIC ACID—ROSIN OR RESIN—OTHER NEEDFUL APPLIANCES.

IN these and other papers to follow I propose to try to clearly describe and illustrate the methods employed, the patterns and dimensions, and the tools used in the trade of a tin-plate worker, tinsmith, or tinman, who has, perhaps, a greater variety of work to do in the various sheet metals, tin, zinc, iron, copper, and brass, than any other workman, especially in a country shop where he has to take the whole of the work, sometimes in conjunction with a smith, but as often as not by himself.

Of the prospects of the trade, I will only say that a man who can qualify himself to take such a place as I have mentioned can always get a job, and can (in reason) name his own wages. In these articles, though I shall not be able to fully describe every article or process, yet I shall endeavour to make as comprehensive a selection as possible; and my hope is that they may be of use to many.

How I should have welcomed a magazine like WORK in my 'prentice days! and I would say to all young men who have started to take it in, stick to it; don't growl because your pet hobbies and ideas do not come out in the first number, or even the first

The Works Magazine Reprint Project (-) 2012 toolsforworkingwood.com



twelvemonth. Make a hobby of something that is appearing, remembering that what you put in your head no one can take away from you. With these few hints, I will commence the first part of my subject, which will treat of soldering, brazing, and tinning.

Soldering.—This may be defined as the art of uniting two metals by means of an alloy termed solder, applied to the work with a tool called a soldering iron, or copper bit as it is sometimes termed, various fluids and substances termed fluxes being used to facilitate the melting and flowing of the solder, and to assist it in adhering to the work. That soldering is not such a simple process as it looks, most people, who remember their first attempts, will readily admit. How the solder positively refused to go where it was wanted, and how resolutely it seemed to stick where it was not wanted; how, when after much patience and waste of solder we managed to do the job we were at, it as often as not fell to pieces with very little provocation. Such reminiscences must be familiar to many who have dabbled in metal work of any kind. But these faults and failures are more from not understanding the fundamental principles of good soldering than from any real technical skill being required; and it is my aim and object, in these instructions, to show clearly how to succeed and the causes of failure. Soldering playing an important part in many things besides sheet metal working is one ofthe reasons why I take it first in my list of subjects.

Soldering Irons.—I will now proceed to describe the soldering irons. These are of various sizes and shapes, according to the work to be done. Fig. 1 is the ordinary pointed soldering iron used for general work. Fig. 12 is called a bottoming iron, and is used for soldering round the bottoms of such things as saucepans, boilers, etc. Fig. 4 is called a hatchet bit: this is more used by plumbers than by tinsmiths. Fig. 2 is similar to Fig. 1, only bent at the point and lighter.

There are several things to be noted in buying or making soldering irons. There should be from four to five inches of copper, exclusive of that which is riveted in the shank, as with the constant usage, and the filing and drawing out, the length soon diminishes. Then it should not have a long shank, as a long iron fatigues the arm very much, not only by the weight of the iron, but by the cramped position into which it throws the arm.

Generally speaking, the soldering iron should be about 16 inches long from point to extremity of handle. The handle also calls for a few remarks. Most of the copper bits on soldering irons sold in the shops are fitted with common file handles with iron ferrules; the shank is generally drawn to a point and stuck in about two inches; the consequence is that, after using a short time, the handle shrinks, the ferrule slips off, the handle splits, and the iron draws out, causing great annoyance and waste of time. If the handles are made as shown in sketches, they will afford a firmer grasp, balance the iron better, and last as long as the soldering iron itself. They are turned from good sound beech, 5 in. long, and 1⅛ to 1¼ in. diameter. A groove is turned in them to receive a binding of copper wire instead of a ferrule. A hole should be bored about three-parts of the way through the handle, the size of the round shank; the remainder should be burnt through with the pointed part of the shank till the point comes through about ¼ in. It can then be either bent and clenched into the end of the handle, or riveted with a small burr or washer. It is worth while to take this trouble with them in order to get them secure. I have more than once seen a heavy iron slip out of its handle while being carried up a ladder, to the great danger of the man's mate standing below.

The next subject to consider is the solder. This is composed of lead and pure block or grain tin, in varying proportions according to the work that it is required for. I do not intend to give ten or twelve recipes for solder, some of them only varying in their melting points a few degrees, but simply three kinds. The first is suitable for rough jobbing and outdoor work, such as zinc roofing, etc. To make 7 lbs. of it, take 4 lbs. of tin and 3 lbs. of lead, melt the lead in a lead pot, and add the tin when melted, stir well with a ladle, and remove the dross which will float on the top, and run out into strips in moulds made by bending some pieces of sheet iron anglewise, and turning the ends so as to prevent the metal running out. These moulds should be about 14 in. long. (Fig. 5.) This solder melts at about 350 deg. Fahr. For a finer solder for all general purposes, new work, etc., take 4 lbs. tin, 2 lbs. lead, or in that proportion, viz., two to one. This is a splendid flowing metal, and is good enough for anything. If blowpipe solder is required, take the same proportions as last mentioned, and add one part bismuth, run out in very fine strips.

The best way to do this is to take a small ladle, and drill a ⅛-in. hole in it near the top edge. (See Fig. 7.) Dip a ladle full of solder out of the pot, and, holding it over a sheet of iron or cast-iron plate so that the bottom of the ladle just touches the iron, cant the solder towards the hole, at the same time drawing the ladle from left to right; a fine stream of metal flows through the hole in the ladle, which cools as it touches the cold iron plate. A little practice will soon make perfect. Blowpipe solder should be kept in a canister to keep clean.

It is very often required to make solder when no tin is available. In fact, in most ironmongers' shops they seldom use tin for making solder, as they buy up scrap pewter, such as old tea-pots, beer measures, etc. Pewter being an alloy of tin and lead, it is obvious that if it is used to make solder with, a smaller quantity of lead must be used than if tin and lead were being used; it is a difficult matter to give a proportion of lead and pewter to make solder, as some articles are of a better quality than others, that is, they contain more tin. But as a general rule I have found that it is not wise to put a larger proportion of lead than 3 to 10 of pewter.

Test for Solder.—As a guide in cases of doubt, after mixing the metal, run out a stick and watch it cool: should it cool with a bright silvery appearance, it will not be far wrong; should it turn a bluish grey, it shows too much lead; should it turn dull white and pit all over with little dots, too much tin. The remedy is obvious: add whichever metal is wanted, a little at a time, trying it after each addition till you get it right. It is also a common way of trying it by bending a stick; if it emits a slight crackling it is good; should the crackling noise be too pronounced it will bear a little more lead, and in fact a good working hard solder is that which on crackling very slightly has a trifle more lead added. I think this is all I need say on the preparation of solder, except that no zinc must be allowed to get into it, as a very small quantity of that metal will utterly ruin a pot full of solder. Old composition pipe also should be carefully kept out of the solder.

Fire or Stove.—Our next thing to consider is the fire or stove. There are several stoves made specially for soldering. Fig. 3 is a very good form. The top part lifts off; the front and outside grating are in one piece, and also removable to clear out the ashes that drop through from the top part; the whole stands in a cast-iron tray. They cost from 20s. to 25s., and may be procured from Messrs. Rhodes and Sons, Wakefield, a firm whose reputation as makers of tools and machines for tinmen and sheet-metal workers is world wide. To say that a tool or machine is of Rhodes' make, is to say that it is all that can be wished; such, at any rate, is my opinion, and was that of my father before me, and readers of these articles would do well to get their catalogue. There are, of course, other firms of good repute, but of these I cannot speak from experience. To return to the subject of stoves, Fig. 11 is a sheet-iron fire-pot mostly used for outdoor work; most workmen make their own, and I will give particulars of this farther on.

Fuel.—With regard to fuel for these stoves; coke is the best for the indoor stove, and charcoal for the outdoor one. Years ago charcoal was almost universally used for both shop and outdoor work, and it is no doubt the best in many respects, being easily lit and easily kept alight, but coke being much cheaper, has to a great extent displaced it, though some still would not use anything but charcoal. Coal is not a good thing, as unless it is a clear fire it blacks and smokes the irons; but, as the showman says, you can pay your money and take your choice.

Gas Stove.—Gas stoves may also be used for heating the irons, and where gas is cheap, or for amateurs who do not do a great deal of soldering, I am inclined to think that they are a better means of heat than a fire, being clean, always ready for use, easily lit and put out, and the irons are not so liable to be burnt through non-attention.

Home-made Gas Stove.—Mr. Fletcher, of Warrington, makes stoves specially suitable for this purpose, or the workman can make his own for a trifle. Fig. 9 is a stove that I made very recently, which answers the purpose for which it was intended, viz., keeping one iron constantly in readiness, very well. It consists of a frame of stout hoop iron 8 in. by 3 in. and 3 in. deep; the burner is a piece of ½-in. gas pipe, welded up at one end, cut off 7 in. long, with 1⅛ in. of thread cut on it. A backnut is then screwed on it, and a row of holes ⅛ in. diameter, or a row of saw cuts, whichever comes easiest, is then made in it, commencing ⅜ of an in. from the backnut and going to about 1 in. from the other end; ten or twelve holes or cuts will do. A hole is then cut or drilled in one end of the frame, large enough for the pipe to go through, and an air bulb is then made as follows: Take a 1-in. to ½-in. diminishing socket, and cut a dovetail in it as Fig. 8; then cut a piece of brass the shape of Fig. 6, ⅛ in. thick, and wide enough at the ends to fit the dovetails; in the centre drill and tap a ⅜-in. hole, rivet the piece of brass in the socket, cut a thread on a piece of ⅜-in. brass tube 3 in. long, fix a No. 2 or 3 gas-burner in it, and screw it in the cross-piece of the air chamber; pass the piece of pipe through the hole in the frame, screw on the air chamber or socket, and then drill four holes in the frame and run 2¼-in. rods across to rest the irons on; support the cover, Fig. 10, and the stove is complete; connect to gas pipe or bracket by means of flexible tubes. If wanted for two irons make frame 2 in. wider and insert another burner.

Fluxes for Soldering.—Having considered

The Works Magazine Reprint Project (-) 2012 toolsforworkingwood.com

the soldering irons, the solder, and the fire-pots and fuel, we will now turn our attention to the various fluxes required for soldering.

I. *Hydrochloric Acid.*—This is also known as muriatic acid, or more commonly termed spirits of salts; it is a corrosive poison, and should be kept in a stoppered bottle. In its raw state as purchased it is used for soldering zinc and galvanised iron, and for pickling and scouring purposes previous to tinning; it is not fit for soldering tinwork till it has been what we term "killed" and diluted, which operation is performed as follows:—Into a quart jam or salt jar pour a pint of raw spirits. (N.B.—This operation must be done in the open air.) Into the spirits drop a handful of zinc cuttings a few at a time: this will cause the fluid to boil and give off offensive fumes, which you must be careful not to inhale. When the boiling has ceased to some extent, add some more cuttings and let it stand for an hour; then put a bit or two more of zinc, and if no action takes place it is "killed" sufficiently. Pour the clear liquid into a bottle, and add nearly an equal quantity of water; cork up and put by for use. Some use it without the addition of water, but it is not a good plan.

The spirits thus prepared are termed killed spirits, and are used for tinwork, wrought iron, brass, and copper.

II. *Baker's fluid for tinning and soldering.*—This is a specially prepared article sold in bottles. It is supposed to answer for all the purposes of spirits, and it is a good thing to use for new work, as it is not so corrosive as spirits; but it is not so good for zinc, especially if the zinc is a bit dirty, as the fluid does not seem to possess that cleansing power that the raw spirits have.

III. *Rosin or Resin.*—This was at one time the chief, and, indeed, I might say the only, flux used for soldering; it is used a good deal now in many places for new bought tinwork, especially any that is likely to be in stock a long while. For tinwork it is used pounded fine, and mixed with oil to the consistency of paint, and applied with a brush; it should be wiped off whilst warm. It is also used for soldering lead pipes, making joints in electrical wire, etc., being entirely non-corrosive; in fact, rather preservative. There are two kinds, the black and the white (so-called); the white is the dearest, but it is no better for our use than the black. These are the principal fluxes used.

Other Needful Appliances.—A few other tools and appliances are required in soldering, viz., a jar to hold the spirits, a lump of sal-ammoniac, a file or two, a scraping knife, and one or two brushes for the spirits. I make mine by turning a tin tube on a bit of quarter rod, cutting a knot of hair out of a broom, slipping it into the tube, and flattening it with a blow of the hammer.

Tinning Iron.—Having got all these in readiness, before anything can be soldered the soldering iron must be tinned. Heat it in the fire to a blood-red, then grip it in a vice if you have one, and file the four faces quite bright; dip the iron in the jar, in which you have previously poured about a gill of killed spirits, then rub it on the piece of sal-ammoniac, holding a stick of solder to the point of the iron and melting a little on to the lump of sal-ammoniac, rubbing and turning the iron at the same time. If it is hot enough the solder will flow and coat the face of the iron. This is called tinning the iron. Dip again in the spirits, and the operation is complete; and it should be the aim of the workman so to use his irons that they shall not require tinning oftener than is necessary. I have used, and seen other workmen use, a pair of irons for a day's work, and, by judicious management, leave them in nearly as good condition at the end of the day as they were at the beginning, without filing them at all; and, on the other hand, I have known some who seemed to have the unhappy knack of constantly burning their irons, as it is called when left in the fire too long, so that they get red-hot and the tin burns off. The degree of heat required varies, of course, with the job to be done, but, as a kind of guide to general use, it should, when taken from the fire and held about an inch or so from the cheek, give off a hot (not warm) glow, and a peculiar sharp hissing sound when dipped in the spirit pot, which should always be done before commencing to solder anything. Some workmen have a jar of sal-ammoniac water to dip the iron in, to save dirtying the spirits. It is a very good plan, but as far as my knowledge goes it is not much practised.

SIGN WRITING AND LETTERING.

BY HENRY L. BENWELL.

(*Continued from page* 198.)

SUBDIVISIONS OF SMALL LETTERS OF ALPHABET—ITALICS—SPACING—ROMAN CAPITALS.

HAVING shown in the last chapter that all letters are formed of straight lines and curves, either singly or combined—not that they could be very well formed by any other means—the student who has never given much thought to what he might consider so small a matter, should now be better able to grasp and understand the individual construction and character of all the letters in our alphabet. But, before leaving this subject entirely, it is necessary to again subdivide the alphabet as regards small letters, technically called by the printing profession "lower case," and also "script," or hand-writing letters; in the latter case both capitals and small letters being so divided. We will thus divide them into four classes, viz.: short, ascending, descending, and "kerned" letters. The short letters are A, C, E, I, M, N, O, R, S, U, V, W, X; ascending letters consist of B, D, F, H, K, L; and descending letters are G, J, P, Q, Y, Z. Again, "kerned" letters are those which have part of their face hanging over either one or both sides of their shank. In the Roman F and J are the only "kerned" letters, but in Italic (which I do not illustrate at present) they are B, D, F, G, H, J, K, L, P, Y. The reader may ask whether it is absolutely necessary to go into this minute definition or analysis of the alphabet, so I will now show that it is, and, moreover, that all good sign writers ought to possess such knowledge. In the first place, most of the different styles of letters used by the sign writers are facsimiles, or, at least, very close copies of the ordinary printing type letter.* This is caused in a great measure, I believe, by the sign writer originally learning his letter-forming by taking as examples the specimen sheets of letters found in the "Book of Alphabets" sold by decorating firms and publishers, and which are frequently printed from ordinary type to save the expense of engraving specially designed blocks suitable to the purpose. A good many professionals are also very fond of making complete sets of ornamental letters from any printed example which may take their eye, but which, I am sorry to say, is not always so pleasing to other people, especially to those with an advanced artistic taste.

Now, in type founding it is usual for "kerned" letters to have part of their face overhanging the body of the type, and the type is cast in this way in order to economise room and prevent an ungainly appearance, which would be caused if the face were wholly on the body, since a blank would intervene in the midst of a word almost equivalent to a space, *i.e.*, a blank lead inserted to divide words. This is done by the type founders because the compositor is unable to have any share in the proper spacing of letters; but with the sign writer it is different, as he has unrestricted freedom in the spacing of his letters and displaying his words, and it is to this point which I have been working up to. I would therefore point out to the novice that, in cases where he is using such letters as have just been described, he must give the utmost care and attention to their spacing, otherwise his work when completed will have a most ungainly and awkward appearance. To make this fact the more apparent, let us suppose he is called upon to write in Italic letters the word

Swaffham

and executed his work as shown in the word; it would, of course, look most unsatisfactory—in fact, divided in the middle, or consisting of two words. This is caused solely by bad spacing. Now, let us try again and see how the word appears when it has been judiciously spaced, such as this specimen—

Swaffham

Now the word has a symmetrical appearance. The defect in the first example lies in the fact that the "kerned" letters take up more space in width than the others, so to have each letter regularly spaced in this identical word it is necessary to have the short letters a little wider apart than would otherwise be the case if no "kerned" letters were used. Difficult words, such as this, require much forethought, but I shall speak more fully on the subject of "spacing" in a subsequent chapter, having said enough for the present to show how essential it is for the student to consider the alphabet in all its forms and phases, and more important still—what a help such knowledge will be to him in his after-work.

Presuming that the student has by this time made a fair advance in drawing letters of the sans-seriff order, I must now direct his attention to more difficult work in the shape of alphabets of Roman capitals, Fig. 33. The small letters I leave for the next chapter. With the exception of the first six letters, I have drawn the capitals in the style known as "Open Roman." They will, of course, require more practice to form correctly than their more simple predecessors, but as the Roman is one of the most commonly used styles, they must not be left till perfection has been attained. The small letters should be in due proportion to the capitals—that is, the former should be one-half as high as the latter.

Hitherto the student has practised drawing his letters in outline only; he may now go a step further and commence to fill them in from A to Z, as shown from A to F in

*As I do my own printing I am in a better position to know this, perhaps, than the ordinary sign writer, who very often is unaware of the fact.—H. L. B.

The Works Magazine Reprint Project (-) 2012 toolsforworkingwood.com

Fig. 33. He will do this with the camel-hair pencil and paint, having first gone over the outline in the same way. This outline, be it said, should be drawn first of all, not with chalk, but very softly with a piece of Brodie & Middleton's sign-writer's pipe clay, which only costs about 3d. per dozen sticks, and will last at least a year. In filling in his letters there is one thing the novice will quickly discover, and that is that they (the letters) show up their defects more plainly when filled in than they did when only in outline, but to counterbalance this, he will also find that it is possible very often to perfect the shape of letters in the act of filling in, but this discovery should not in any way encourage him in making a careless drawing of the outline of the letters at the outset.

Having made satisfactory progress so far, we must next pay attention to the numerals 1 to 0, and the stops, commas, brackets, dashes, and braces, as shown in Fig. 33. Their proper use will be described in the chapter devoted to spacing and display, so that it is sufficient for the present to learn how to make them. This, like the rest, comes with repeated practice.

Fig. 33.—Solid and Open Roman Capital Letters and Numerals, Brackets, Dashes or Rules, and Stops.

The Works Magazine Reprint Project (-) 2012 toolsforworkingwood.com

LATHES FOR EVERYBODY.

BY SELF-HELPER.

You must not imagine, reader, from the title of this article that I am the chosen advertising agent of some enterprising firm of lathe manufacturers who sell lathes from sixpence to five thousand pounds, to suit every pocket. No; I would be the worst person in the world for that task, as my passion would be sure to assert itself in the end, and that is a passion for lathe making.

Like most amateurs who have any pretensions to skill, I have had a great number of pupils in mechanics, men who would come to see my workshops, and, attracted by the beauty of the work which can be there done, would request that, if they were not in the way, they might come now and again and watch the various processes and learn as much as they could from them.

Such were usually welcome. I have had village tradesmen, and those very worthy individuals who are sometimes called handy men, sometimes Jacks of all trades, as well as amateurs in the strict sense of the word, among my pupils.

Them, as soon as I saw that their love for mechanics was really sincere, I almost invariably recommended to make a lathe. "Make a lathe!" many of them would repeat with astonishment, glancing at my highly polished and japanned machines which cost me months of patient labour.

"No, my dear friend," I would reply; "not one like that, at least not just yet, but one that will do, and do well, all that you require to do at present."

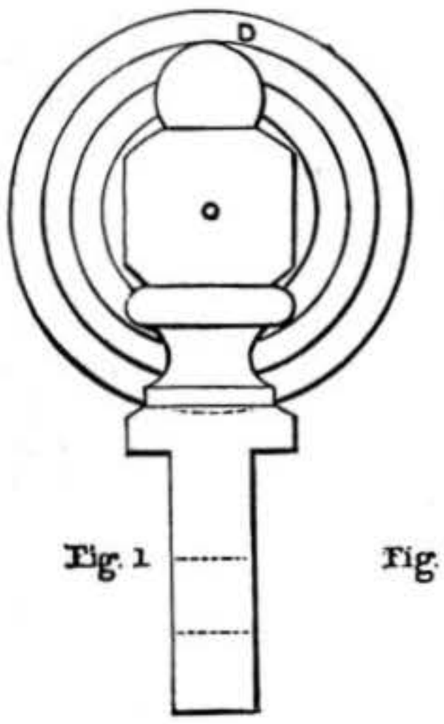


Fig. 1.

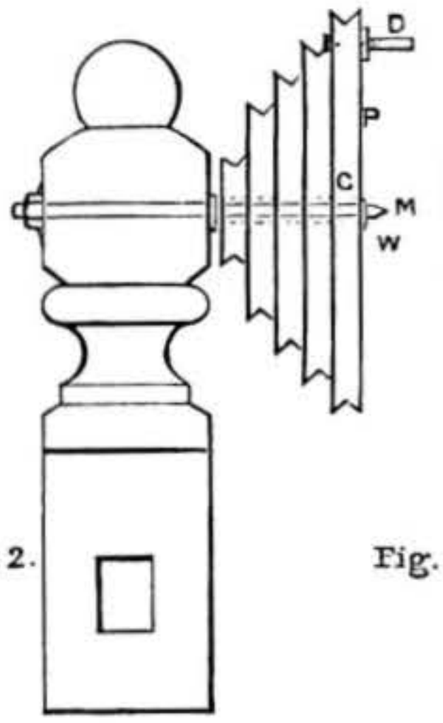


Fig. 2.

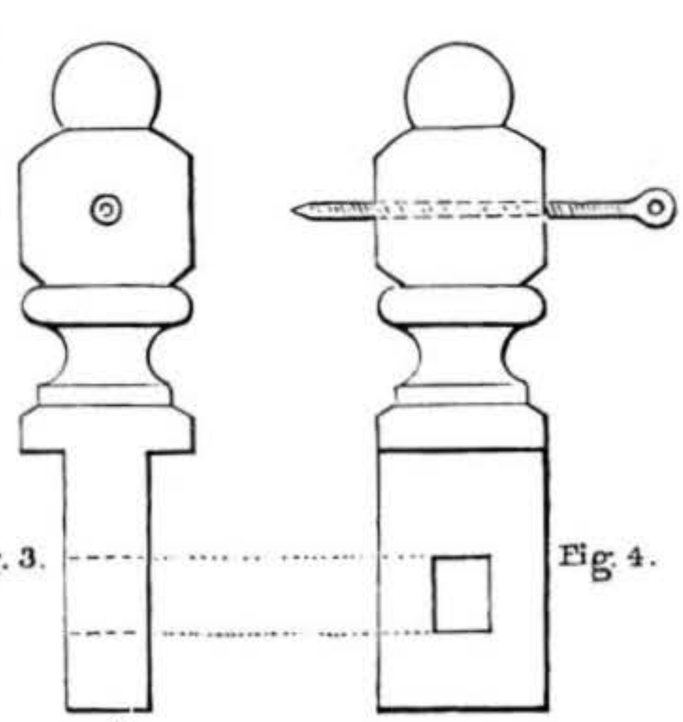


Fig. 3. Fig. 4.

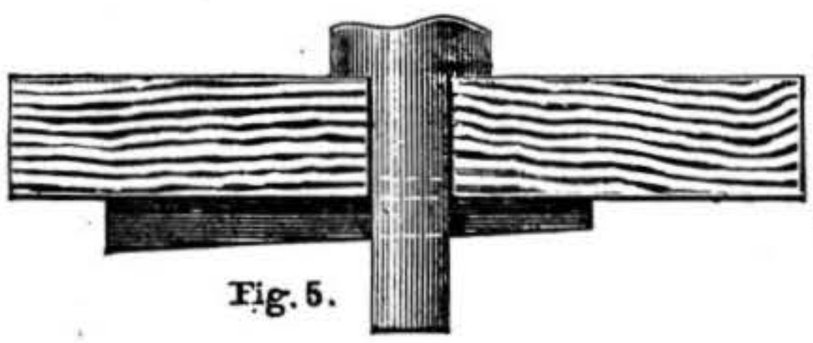


Fig. 5.

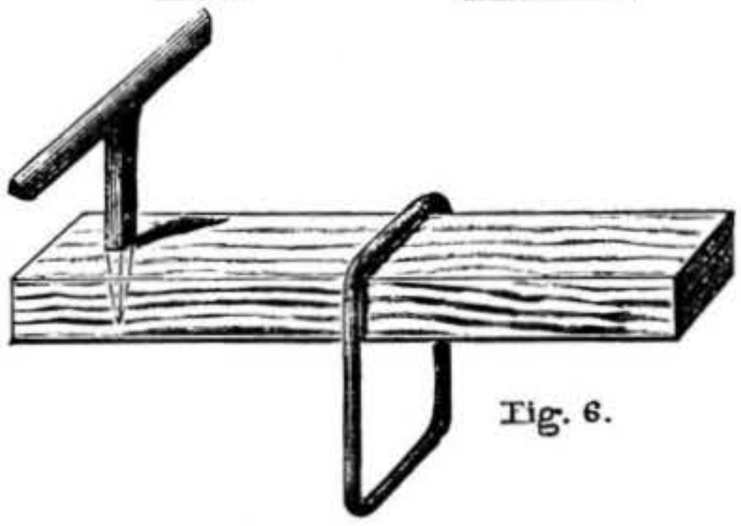


Fig. 6.

Figs. 1, 2.—End and Side Elevation of Fixed Headstock, showing (P) Pulley, (M) Mandrel, (D) Driving Pin, (G) Gun-barrel Bush, (W) Wire Knotted to prevent Pulley running off, Mortise for holding down Wedge (Scale, 1½ in. = 1 foot, or one-eighth size). Figs. 3, 4.—End and Side Views of Poppet for Simple Wooden Lathe. Fig. 5.—Mode of Fastening Poppet to Bench with Wedge. Fig. 6.—Hand Rest with Stirrup of Half-round Iron, which passes through Bed and is fastened with Wedges.

And so I have been the father of many and many a lathe. Now, when I look back upon my pupils, I feel that my life has not been all in vain. Some of them are doing remarkably well. One, who pooh-poohed the idea of his having or using a lathe, is making a large amount of money by it, and he is an amateur. Another, a tradesman, is taking all the work from his fellow-tradesmen because he can beautify his dressers and tables with sundry turned legs and knobs, which they vainly try to imitate by hexagonal and other angular productions; while a few potter about their workshops like myself and derive nothing from their hobby but the unalloyed pleasure which it gives them.

Stay, though, is that true? Not it! Are there not sundry little tables and stools and boxes and candlesticks about the house which found their birthplace in these workshops? Yes, verily. Are there not many jobs brought there which otherwise would find their way to the village tradesmen, and have to be paid for in shillings and pounds?

Certainly there are. I am convinced that I must qualify the expression that I derive nothing from my workshop but pleasure. If it does not bring money in, it prevents it from going out, and that amounts to about the same thing.

Now a lathe was my first start as an amateur, and a lathe I made myself. Since then I have accumulated other lathes, and tools of sundry and divers descriptions about it, but the lathe was the start.

The readers of WORK may be divided into two classes, amateurs and professionals. The amateurs may begin with a lathe, and build up their knowledge, with that as a basis, as I did. The professional will use his lathe as a means of increasing his income. There can be no doubt that the intelligent village carpenter or joiner would increase his income considerably by having and using a lathe. Many jobs which have to be sent to the city or the nearest turner could be done at home; for instance, rollers for mangles, spindles for washing machines, rolling pins, wooden platters, table legs, finials, knobs, and a thousand other things which are sure to turn up. These are usually paid for at a high rate considering the time spent on them, and this money the tradesman could put into his own pocket. Add to this that pieces of rustic furniture, which are now usually finished with either square or octagon legs, could have them nicely turned at the same price, while knobs which cost 3d. or 4d. could be made for nothing, and turned pillars and ornamentation could be added *ad libitum*.

The country people are vastly taken with anything that appears grand, and I am sure the village carpenter who supplied his furniture, for instance, tastefully finished with plenty of turning about it, would soon rival all his compeers, and be a rich and prosperous man.

We often see very taking advertisements in the newspapers telling us how to add £2 a week easily and honestly to our earnings. If I was asked how to do this, I would say "Buy WORK, and do what it tells you. It will recommend the best plans for doing everything, and, by following its directions, you will work intelligently, and not do a thing simply because you were told to do it so."

To return to the lathes. I lately designed a lathe for a very beginner at the work, which will serve to show how an efficient tool, for it is efficient, can be made out of the very simplest materials.

My enthusiastic young friend has a good grindstone, about two feet in diameter, mounted on a low stand, and driven by a treadle. This I pitched upon as a fly wheel. He was about to make a bench. I asked, as a special favour, that the two 9-in. planks which formed the top should be left a couple of inches apart. The space could be filled up with a slip of thin wood when the lathe is not in use. I give diagrams of the heads. They are of oak, 4 in. square, and about a foot and a half long. Of course, any hard wood would do as well; beech would, perhaps, be better. I beautified them a bit by turning a knob on top, and also the space between the centres and bench, but this may be neglected by a man who has not a lathe; who, if he is æsthetic, may stop-chamfer them instead, and, if he is not æsthetic, may leave them rough as they come from the hatchet or saw. The height of centres I made was 6 in., and the tenon shown at the lower end of the heads was 2 in. wide to fit nicely between the planks which formed the top of the bench.

The position of the mortise depends on the thickness of the top of bench. In my case, it was 2¾ in. from shoulder, and was 2 in. deep and 1½ in. wide. Fig. 5 shows how a long tapered key of hard wood fastens these heads to the bench. In Fig 2, which I will call the fixed headstock, there is a mandrel of Bessemer steel, fastened by a shoulder in front and a nut and washer behind. It extends four inches forward from the head, and has its end pointed to an angle of 60 degrees.

I turned this in the lathe; but, if any one of my readers has a difficulty in doing this, he may well be content with a piece of Bessemer steel 8 in. long and ¾ or ⅞ in. in diameter. One end could be filed to a fairly true cone, and the other driven tightly into a hole bored in the headstock. I had a piece of gun barrel ¾ in. in diameter, which I made

The Works Magazine Reprint Project (-) 2012 toolsforworkingwood.com

the mandrel to fit, and then I drove the barrel into a piece of wood which was to serve as pulley. This was of peculiar construction. It consisted of three pieces of oak one inch thick, and screwed and glued together with the grain crossed.

I mounted this on a face-plate, and turned a hole for the gun barrel or bush, and also the various speeds. The largest of these is 10 in. in diameter, and the smallest about 2 in. A very good job could be made of the pulley, without the aid of a lathe, by first boring the hole for the bush, and then, with a compass and chisel, making the pulley as round and true as possible. When mounted on its own mandrel it would be turned quite true by fitting up a temporary band and changing it from speed to speed.

The pulley is kept from running off by cutting a groove round the mandrel before it, and tying a piece of stout wire in the groove in such a way that half its thickness projects over the surface of the mandrel.

With regard to the gun barrel, I am sorry that I cannot offer my readers a piece from my stock, but I just used the last bit of a long musket barrel in making a lathe similar to that I am describing. Steel tube can be got now from most large ironmongers, and if there is any difficulty about it, ordinary drawn brass tubing would do very well.

Messrs. R. Lloyd & Co., Steelhouse Lane, Birmingham, would, I am sure, supply tubing and Bessemer steel to suit for a few pence.

The other headstock or poppet has a screw 8 in. long and $\frac{3}{4}$ in. diameter to take the place of a mandrel. My friend has to revolve this with the help of a "tommy" until he gets brains and skill enough to fix a hand wheel on the end. A long, stout bolt or bed screw is a fair substitute for this screw, which, to some, would be troublesome to make.

The hand rest is somewhat original. It consists of a baseboard of oak $1\frac{1}{4}$ in. thick, 2 in. wide, and a foot long; into one end is stuck the T, and it remains there permanently.

A stirrup of $\frac{1}{2}$ in. round iron passes through the slot in bench; the baseboard is slipped through it on top, and a wedge, somewhat similar to those used for fastening the heads, slips through it under the bench top. Things are arranged, however, so that the baseboard can be raised about a quarter of an inch from the top of the bench when the stirrup and wedge are in position, and a second long thin wedge is slipped between the top of bench and the bottom of rest, and thus clamps it firmly in any position. The plan looks crude, but works admirably.

A driving pin is fastened to the pulley. It is a $\frac{3}{8}$-in. round bolt with the head cut off and fitted with two nuts, one inside and the other outside of the largest speed. The inside nut I had to sink somewhat into the wood so that it would not strike the band when revolving. When the pulley revolves, it brings the driving pin into contact with a carrier fastened to the end of a piece of wood, and thus revolves the latter also.

I think I have now shown how a lathe can be made from materials that are found in most workshops, and a lathe which will do an immense amount of good honest work.

If a fly wheel were used instead of a grindstone it would be sometimes preferable. If the latter is used, it should be a kind which will admit of the trough being lowered out of the way to facilitate the shipping of the band.

I had intended to give a few hints on the construction of a still simpler lathe, but I will now bring this short paper to a close, hoping that it will prove useful to some.

I do not know whether I have made it sufficiently clear that when the lathe is required to work, the heads and hand rest are slipped between the two planks which form the top of the bench, and keyed there with the wedges. The grindstone is shunted underneath the bench, and a band passed between it and the pulley through holes bored in bench top for the purpose, and the lathe goes "merrily as a marriage bell."

PIN-HOLE PHOTOGRAPHY.

BY L. IVOR POOLE.

THE idea of taking photographs without a lens seems, at first sight, so preposterous that readers who have not heard of it may almost be excused if, on being told that this article is written to inform them of its practicability, they are inclined to fancy that an attempt is being made to impose on their credulity. It is almost needless to assure them that there is no such intention, the desire being merely to direct attention to the possibility of taking a photograph with the very simplest apparatus, no lens at all, and no camera to speak of: nothing but a light tight box, and some contrivance to hold the plate. I do not, however, propose to write any instructions about these, but merely to make a few remarks on pin-hole photography for readers who wish to try it.

Most of us, when we were boys, either in our scientific amusements or in perfunctory lessons on optics, no doubt became acquainted with the fact that if a very small hole were bored in the window shutter of an otherwise darkened room, an inverted image of the view outside would be cast on the wall behind. I suppose very few of us ever satisfied ourselves by actual experiment; I know I never did. The conditions were altogether too irksome, and it was one of the assertions to be received on trust. No doubt it is correct, but an ordinary photographic camera is far preferable, and any one who will take the trouble to replace the lens with a piece of cardboard, through which a small hole has been bored with a pin, will find the image thrown on the focussing screen; not so vividly as when a lens is used, the amount of light which enters the camera being much less, but still, all there and quite perceptible.

Now, it stands to reason that if a sensitised plate is exposed, the image will be imprinted, the quality of the resulting negative depending on the same conditions as if a lens had been used. Of course, I am not for a moment implying that lenses are useless, or that they can be superseded by a piece of pricked cardboard, for I don't think it can be disputed that with a lens, better negatives are to be produced than without. There are, however, a few points about pin-hole photography which render it something more than a mere scientific curiosity. Apart from the extreme simplicity of the necessary apparatus, which, alone, would hardly recommend it to serious consideration, there is the strange fact that it is always in focus. The size of the image varies according to the distance between the pin-hole and the plate, but near and distant objects are equally in focus. It is therefore quite possible to make use of any small box as a substitute for the ordinary camera. Some day I may describe the arrangement of an ordinary plate box for taking several small negatives on the same plate, but, in the meantime, it will be sufficient to suggest a few ideas in connection with the photographs themselves.

It is important that the hole should be perfectly even, without any burr on the edges to interfere with the light. With a roughly-made hole it is impossible to take a pin-hole photo. to the greatest advantage. Scarcely less important is the size of the hole. This should be as small as it can well be made, sharpness of the image being greatly diminished as the hole increases in size. The merest prick through is sufficient. Instead of attempting to make a suitable hole in a piece of thick coarse cardboard or wood, it is better to make it in a thin fine piece, such as an ordinary visiting card, and stick this over a larger aperture in the box or camera, the inside of which, of course, must be black. Such an improvised pin-hole lens, if it may be called so, can easily be stuck on with some of the gummed paper surrounding sheets of postage stamps.

The time of exposure, of course, is considerably longer than when a lens is used. Some idea of this may be given by saying that on an ordinary bright day with good light a photograph may be taken on a slow Ilford, with an exposure of 20 to 30 seconds. It will thus be seen that the time required hardly puts the pin-hole beyond use, even for portraiture. Instantaneous views are, however, out of the question with it, as any one who has the slightest acquaintance with photography will at once perceive. Personally, I have never been able to get a picture as sharp as if the negative had been taken with a lens of good quality, but it must be a poor specimen which is not very superior to those taken with the cheap toy cameras, as fitted with a double convex lens. Not that a good photograph taken with a pin-hole is so blurred as to be useless, for at their best they rather resemble those taken with a lens slightly, and only very slightly, out of focus. They may almost be classed as photographs of the "impressionist" school, so that it is quite possible some may admire the slight indistinctness. There is certainly an absence of harsh outline which is sometimes rather pleasing than otherwise, or is it perhaps perverted taste which renders them not distasteful?

The evils of distortion with any but the best lenses are too well known to require attention to be called to them. With a common lens it is impossible to take a photograph of a building without the lines nearest the edges of the plate being curved. In pin-hole photography they are, however, perfectly straight and true, and to me, this seems one of its chief advantages in practical use, not the slightest distortion being observable. Enough, however, has doubtless been said on what many practical photographers, with command of the best apparatus, will perhaps regard as a somewhat trivial branch of the art, to show that is not only interesting, but at times may be useful in enabling a photograph to be taken with an extemporised camera.

BACKING ELECTROS—BALANCES.

BY GEORGE EDWINSON BONNEY.

Backing Electros.—When an engraved surface, or a medal, or a medallion, or a set-up forme of type is copied in copper by the electrotype process, the copy is named an "electro" in the workshop. A mere thin shell of copper, of about the thickness of a visiting card, is deposited in the mould, and this shell must be carefully removed from the mould to receive a backing of some stouter material before it can be used in the

The Works Magazine Reprint Project (-) 2012 toolsforworkingwood.com

printing press or mounted in a cabinet. If a wax mould is employed, the removal of the copper shell is quite an easy matter, for the operator has only to pour a stream of hot water over the back of the mould to cause the wax to melt off from the shell. Any persistently adherent wax can be got off by immersing the shell in a solution of hot caustic alkali. The shell must be got off without buckling it or wrinkling its surface, and it is then ready to be backed. If a small shell, such as a copy of a coin, a medal, or a medallion, place it face downward on a heated iron plate, and brush over the back a little "killed spirits of salts," such as plumbers and tinmen use. Next coat the back to the required thickness with common tinmens' or plumbers' solder. Larger electros are placed on an iron backing plate or tray furnished with handles, and the tray with its electro is floated on a bath of stereotype metal until hot enough to melt solder. The back, having been previously prepared by brushing the ordinary soldering liquid over it, is now coated with solder much the same as copper bits are "tinned" with solder, that is to say, enough solder is melted on to ensure a bright coat all over the back. The hot tray is next removed to a level surface, and enough backing metal is poured on the electro to make the back $\frac{1}{8}$ in. in thickness. The following formula is given by Mr. A. Watt as a good one for the composition of backing metal:—Tin, 4 parts; antimony, 5 parts; lead, 91 parts. Full information on this subject is given in "Electrotyping," by J. W. Urquhart, pp. 212—222.

Balances.—The balances or scales required by an electro-plater will vary with the class of work on which he is engaged. For the ordinary work of weighing the goods before and after plating, to determine how much metal has been deposited, a pair of scales with a stout steel or brass beam will be required. For weighing gold and gilded articles a lighter pair, indicating a turn on one grain at least, should be provided; these will also serve for weighing out the ingredients used in making up solutions. For rough assays and estimations a small cheap balance indicating a turn of $\frac{1}{10}$ grain will serve the purpose; the cost of this, together with weights from 500 grs. down to $\frac{1}{10}$ grain, will be about £1 10s. A still more elaborate and correct balance will be required for assays, analysis, and calibrations; such as an Oertling assay balance fitted with agate bearings and indicating a turn with at least $\frac{1}{100}$th of a grain. Such a balance with a full set of weights will cost from £5 to £10.

In some plating establishments the weight of deposited metal is determined during the operation of plating by means of a plating balance. This is merely a pair of large scales furnished with a scale-pan at one end of the beam and a metal frame suspended over the bath at the other end. The goods to be plated are slung to the metal frame, and the whole is balanced by weights placed in the scale pan. The pillar of the beam is connected to the negative pole of the machine or battery. As the metal goes on the goods to be plated, the beam is thrown out of balance, and the exact weight deposited can be ascertained at any time by additional weights placed in the scale pan. A full illustrated description of this balance, and the mode of working it in French plating establishments, is given in A. Roseleur's *Guide pratique du Doreur, de l'Argenteur et du Galvanoplaste.* An account of the same is also given in "Electro-deposition," by A. Watt.

AN ORNAMENTAL CLOCK CASE AND BRACKET.

BY J. H. MOODY.

(*Continued from page* 242.)

FASHIONING OF SPINDLES—JOINTING OF PILLARS—BRACKET-PIECES—STEPS—CORNICE—CANOPY ROOF—SCROLL—DOOR—FIXING OF DIAL AND DOOR—TREATMENT—BRACKET—FINISHING BRACKET.

IF my small contribution upon the subject of home embellishment be attended by no better effect than that of demonstrating to home-workers how easily an article, till now commonplace, may be made important, it will not have been written in vain; but I venture to predict that it will not be so lightly dismissed. And when the possessor of a clock like the one I altered reads how cheaply the alteration was effected, he will be impelled to undertake the same amount of transformation.

The pillars were each one made in three parts—a procedure which was necessary, as I did not possess a lathe; and it will not be *infra dig.* to confess that I ventured to fashion the turned portions without one, and although many difficulties would have been smoothed over by the employment of such an accessory, yet I succeeded in making very presentable spindles by using only files of various shapes and a dovetail saw. The other portions of the pillars were the top part which carried the pierced brackets and formed the capital, and the lower part which with plinth formed the shaft and base. I left a short plug at either end of the spindles, and I bored sockets in the top and bottom pieces; and when the three parts were joined together by means of these dowel-like plugs and sockets, the pillars looked quite as perfect as though they were made from one piece of wood.

My auxiliaries in carving the stages and sunk panels in the plinth and shaft were a couple of keen chisels; and glass-paper, of course, contributed its quota toward the success of the work; and for material I used $\frac{3}{4}$-in. mahogany for all the parts of the pillars, which when they were finished were fastened to the case by means of screws driven home in deep counter-sinkings. The screws were then concealed respectively by the brackets and by the plinth (Fig. 2).

The eight bracket-pieces which enriched the capital were cut from thin mahogany with a fret saw, and pierced with a brace and $\frac{3}{16}$-in. bit. They were connected in pairs, by pieces of wood of sufficient thickness to keep the individuals of each pair at a due distance apart; and each pair of brackets were then attached to the pillars by glue at the proper places, which will be seen from the drawing.

I next arranged the two steps. One I had already obtained by cutting down the plinth of the original case, and I now finished it by giving it a tread of thin mahogany. The lower step I made from $\frac{3}{4}$-in. mahogany, and also provided it with a tread, and fixed it in position, tightly jammed between the two pillars; therefore glue was sufficient to hold it firmly.

The cornice (Fig. 3) now claimed attention, and the easiest way to make it was a matter for consideration. At last I decided that my best plan would be to make it in two parts—the first part being two beads, with a depression between them. This was done with a bead plane on a piece of wood of suitable thickness. By working first one side and then the other, the two beads and depression were produced. The second part was a slip of wood to carry the carving.

Perhaps the best way to obtain this carving will be to take a cylinder of wood of suitable diameter, and cut and file the pattern right round it. This, when split or divided in its length, will give a better result than if the pattern had been cut on the edge of a slip of wood. The slips of carving being fastened upon the pieces of wood provided as their foundations, the two parts comprising the cornice were glued and pinned together. When the glue was dry, the moulding was cut and mitred to go on the top of the clock at the front and sides only, and fixed on to the piece of wood that formed the roof proper. The edge of this roof-piece became then the third part in the moulding.

The gablet or canopy surmounting the roof was built up of three pieces of $\frac{3}{4}$-in. mahogany, which were cut decreasing in size, and roughly shaped, so that when their surfaces were placed together the whole very nearly assumed the form that I intended to give to the canopy; and to obviate the objectionable weight of solid wood, I hollowed out the first and middle piece, leaving them simple frames each about $\frac{3}{4}$ in. in width. The three pieces being glued together, and dry, were finished with proper tools. A piece of mahogany pinned in to the top formed a ridge. (See Fig. 2, clock case in section.)

The scroll was made of wire, worked with the round-nose pliers and soldered; and the heads of fancy nails supplied me with flowers for it.

The door was made from $\frac{1}{4}$-in. mahogany, and cut to proper dimensions for fitting between the styles; and the panels were carved in it, but were endowed with a degree of importance which the panels upon the pillars did not possess. A piece of thin wood of suitable size and shape was glued on to the face of each panel, thereby advancing it beyond the level of the surface of the door. A circular aperture was also cut in this door for the dial.

The old dial was useless to me, and I procured another bearing ordinary numerals, and painted on delf; but there was no provision for fixing this in position until I glued thin pieces of wood at the back of the door, and just peeping over the edge of the aperture. This prevented the dial falling through to the back; but something was also needed to prevent it from falling forward, and to keep the hour of noon from displacement. To that end I filed nicks in the edge of the dial, and, placing the 12 in its proper place, drove headed pins past those nicks and through into the wooden stops which were glued on at the back of the door. I then procured a brass rim with glass, costing eightpence, from Messrs. Smith, of St. John's Square, E.C. The door was kept in position by a rebate formed by gluing slips of wood at the back of the styles, and by buttons fixed at the front. I cut an opening in the back, so that the pendulum could be readily got at for purposes of regulation, etc.

There is little to be remarked in regard to the moulded stand, save that it were best cut out of the solid plank; but if the tools are not equal to the job, do as I did, and build up and mitre it in the same way as the cornice was procured.

A clock altered in this way when finished, as far as the woodwork is concerned, may be submitted to either of two kinds of treatment: it may either receive polish by a coat of varnish or other means, or it may be covered with enamel paint—a plan that will admit of a wide range of selection, as there are so many useful tints to choose from. Light blue, light green,

The Works Magazine Reprint Project (-) 2012 toolsforworkingwood.com

cream, or even white, would look equally well; and at this point I must say a word or two regarding the bits of ornament occurring in various parts of the design. These may be incised work and gold paint, if the operator feel equal to the task; but if not, the brush may be employed to do the work upon the surface. I got my clock up in black enamel and gold paint, using the latter method, and was well satisfied with the result.

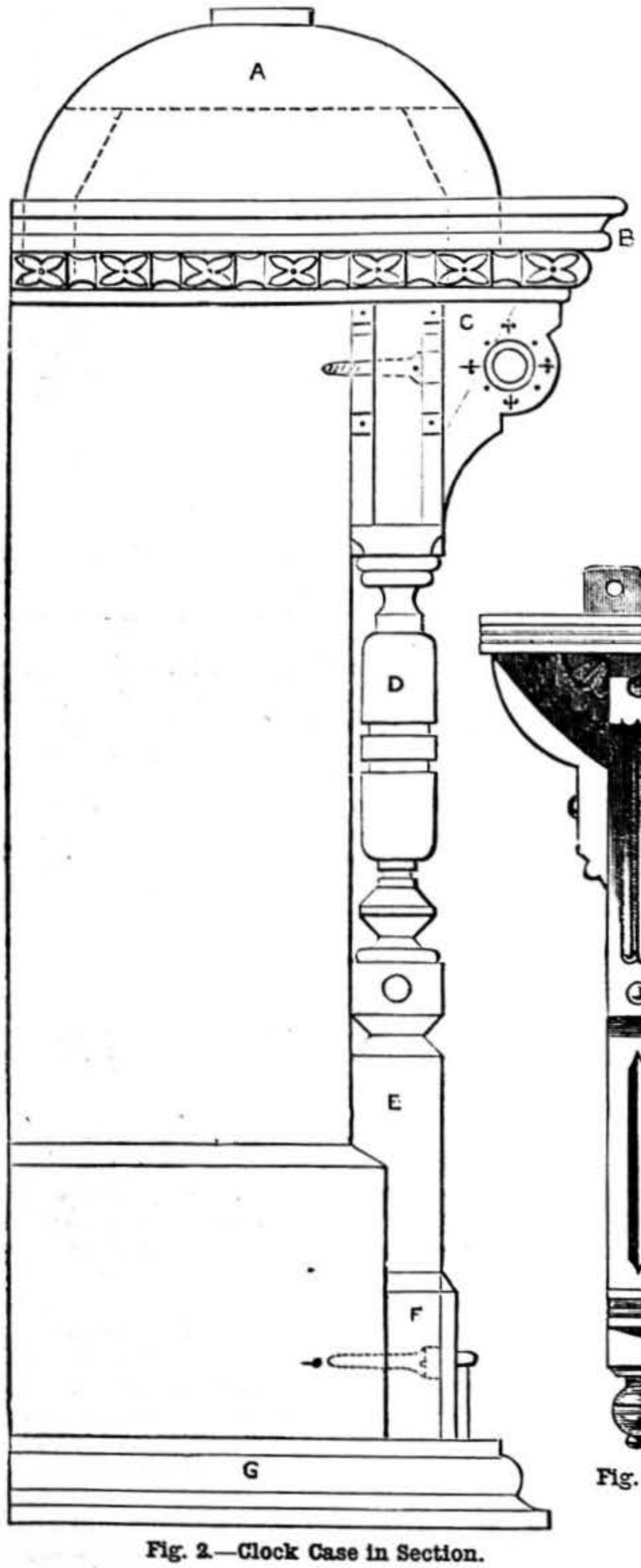


Fig. 2.—Clock Case in Section.

A, Roof, with dotted lines showing Construction. B, Cornice. C, Bracket, with dotted lines showing how to join parts together. D, Spindle. E, Shaft. F, Plinth. G, Stand.

I rather anticipate that this clock will be thought unsuitable for the mantel, because of height and narrowness; but want of width and loftiness may recommend it, especially if the other ornaments are tall or numerous. I would, however, suggest that it is particularly suited for placing upon a bracket; therefore I have ventured to append a design for a bracket suitable for this purpose or for use independently; and as the ornament it bears will be in the shadow of the shelf it will not detract from the importance of the clock above it. This bracket (Fig. 4) may be made of ¾-in. stuff, and the back framed by mortise and tenon, leaving the styles longer at the bottom for the attachment of terminals. It will not be necessary to carry the tenons right through; but great attention must be paid to the close fitting of the joints, and the square cutting of the shoulders of the tenons.

The bracket-pieces must be cut out with a turning-saw; and when the front ones are reeded, and the side ones are dressed smooth, they may then be attached in their places on the styles in manner as follows—the side brackets by dowels, and the front brackets by means of screws from the back. (Fig. 5.)

Before gluing up the framed back, it must be rebated, by the best means at command, to receive the fretwork; and the ornamental furrow, as shown in sketch, must be cut upon the styles. The handrail of the balustrade is mortised into the styles; and the short upright bar in the centre, from which the small arches spring, is let into the top bar of the frame, and into the handrail; and as these two help to support the fretwork, they also must be rebated.

The pieces for the arches and the rails being cut may be placed in the rebates, and secured by slips of beading at the back. But if, instead of being left open, it is intended to fill the spaces with mirror glass, backing boards must be used, and the whole secured by brads after the manner of a picture frame.

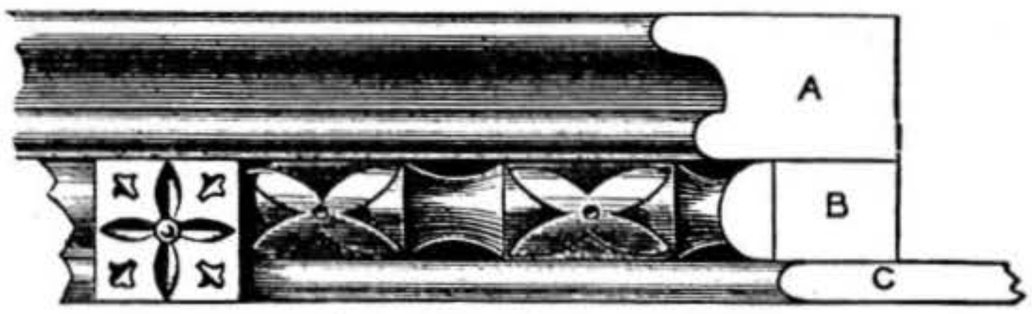


Fig. 3.—Detail of Cornice.

A, Portion made with Bead Plane. B, Portion bearing Slip of Carving. C, Top Piece of Clock.

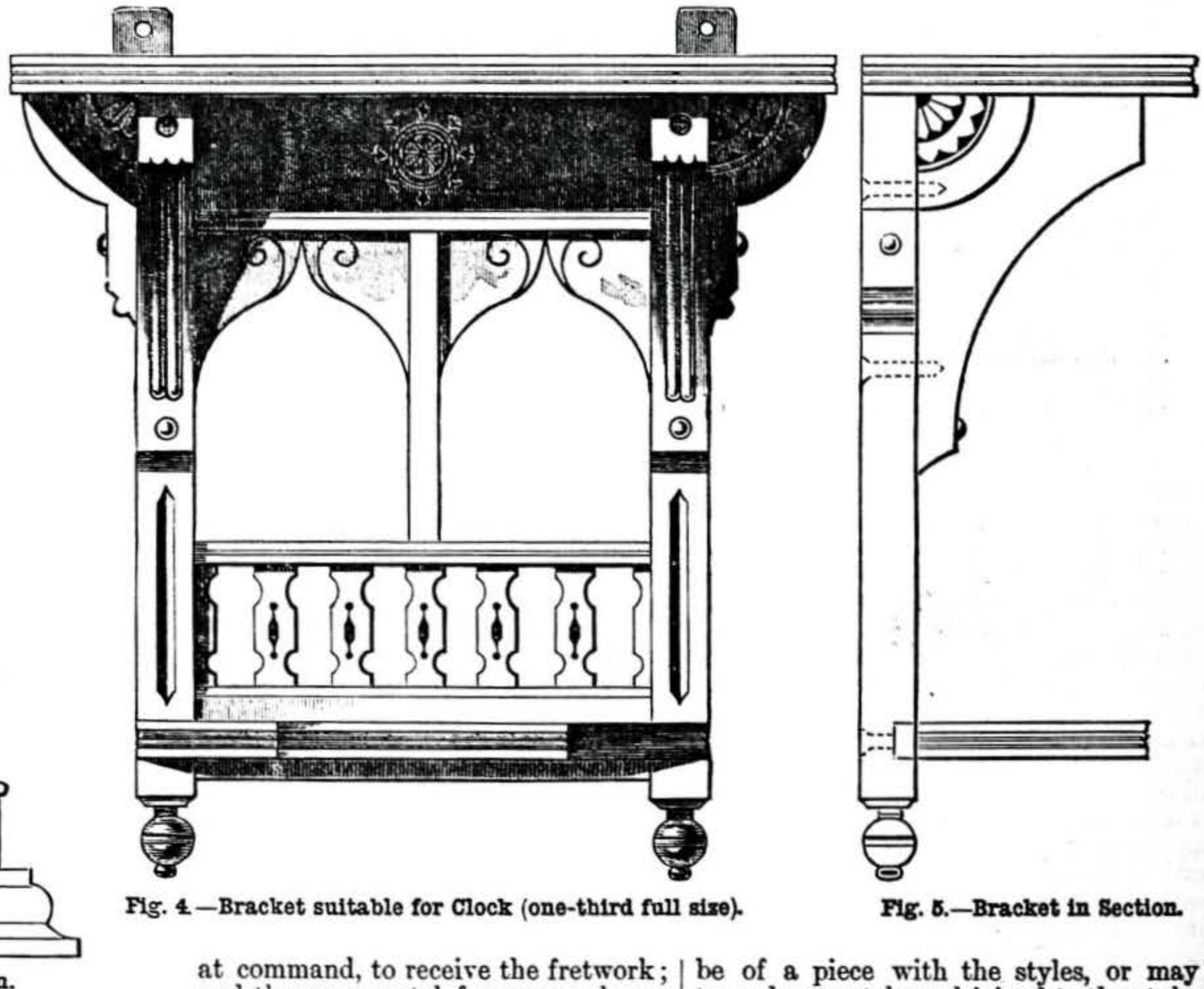


Fig. 4.—Bracket suitable for Clock (one-third full size).

Fig. 5.—Bracket in Section.

The top shelf is cut from ½-in. wood reeded on three edges, and then fastened at the top of all by screws; and, being sustained by the front brackets, it is quite adequate to carry the weight which the clock represents. The lower shelf is of ½-in. wood reeded on the appearing edges, and, not being intended to bear a greater burthen than a small vase, it is simply let into a channel in the lower bar of the framed back. It is cut away to enable it to pass the styles, and screws from the back are sufficient to hold it securely.

I would further call attention to the fact that the lower shelf is not allowed to retain full width throughout, but has its carrying capacity very much reduced by reason of its corners being cut off, thus leaving 3 in. in the centre to boast of only sufficient width to hold a small article. The turned knobs may be of a piece with the styles, or may be turned separately and joined to the styles by means of plug and socket.

Suspension of the bracket is effected by a pair of plates screwed on at the back, and by nails driven into the wall through holes in these plates.

We must, of course, put the same style of finish upon the bracket as the clock received, and then our labours will be concluded. But whether our completed work receive commendation, or whether it deserve condemnation, is largely dependent upon the attention and care that even insignificant details received at our hands whilst the construction progressed. With due care in this respect neither clock nor bracket will fail, I think, to give satisfaction.

The Works Magazine Reprint Project (-) 2012 toolsforworkingwood.com

PAPIER-MÂCHÉ.

How to Mould It, and how to Ornament It.

BY SYLVANUS WARD.

(*Continued from page* 186.)

DECORATION (*Continued*) — BRIGHT GILDING — SILVERING—ARABESQUES—EMBOSSING.

Bright Gilding.—This differs from dead gilding in being done on a polished instead of on a dull ground, besides which the method of procedure is widely different. In dead gilding, the design is carefully pencilled in size, and the gold is only attached in those places where it is intended to remain. In bright gilding, on the contrary, the whole space over which any part of the design may extend is sized and gilt, all superfluous gilding being afterwards removed. The more perfect the polish of the surface on which the work is done the more brilliant will be the gilding.

As in dead gilding, if both deep and pale gold are used they must be put on separately, and the deep is generally applied first, since, being richer in appearance, it will occupy the more important parts of the design.

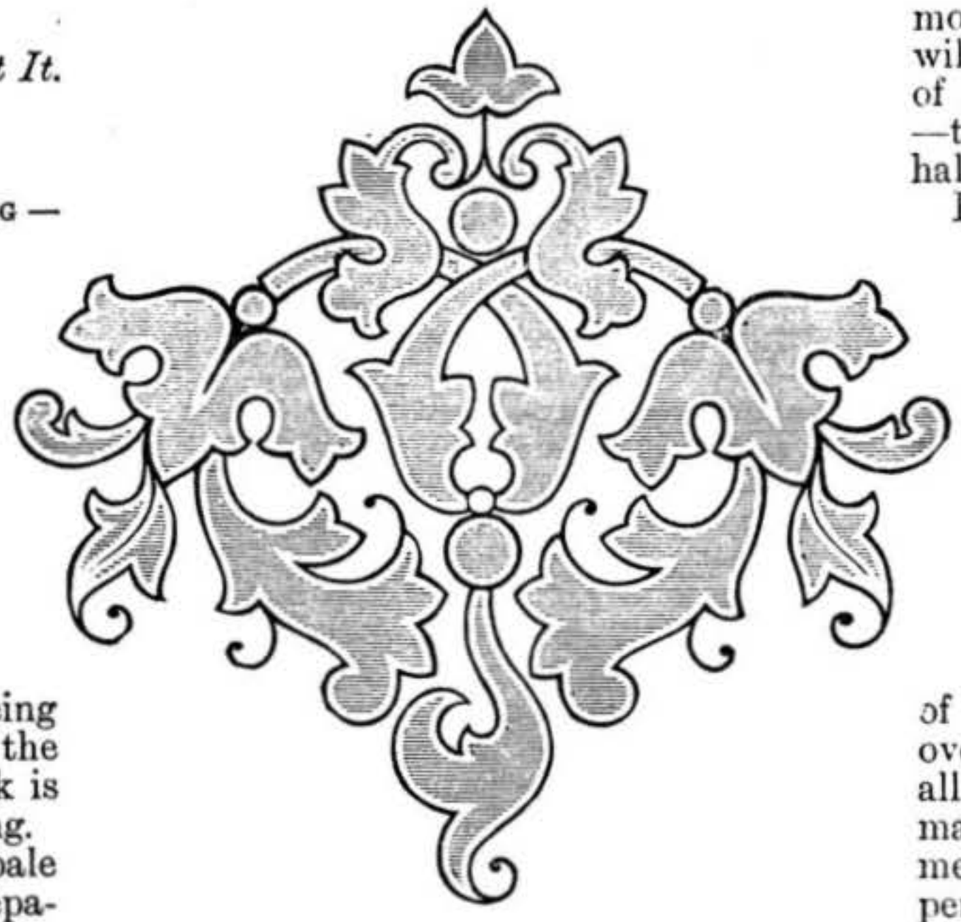


Fig. 32.—Arabesque Ornament in Bright Gold.

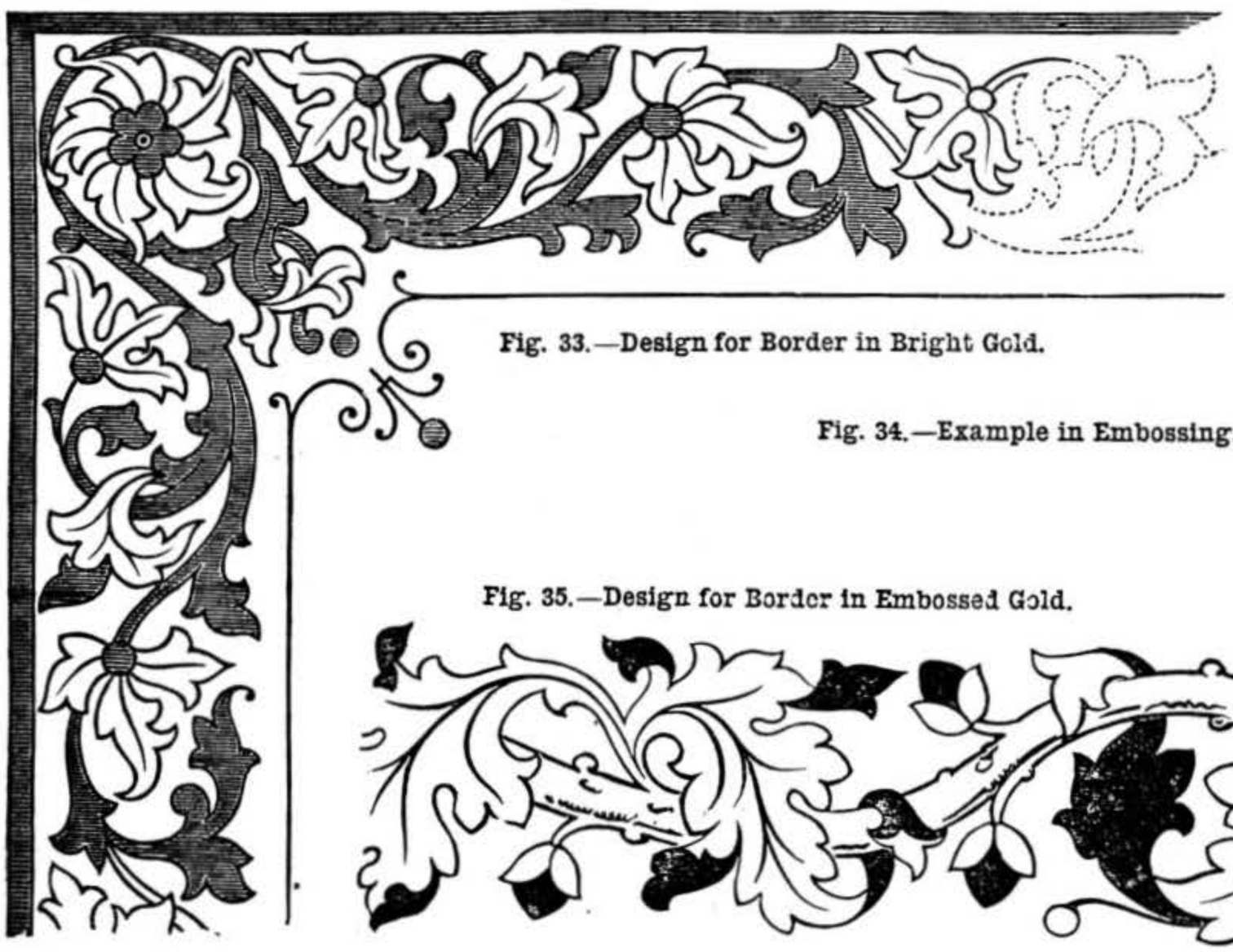


Fig. 33.—Design for Border in Bright Gold.

Fig. 34.—Example in Embossing.

Fig. 35.—Design for Border in Embossed Gold.

As a preliminary operation, the surface should be breathed upon and carefully wiped with a *silk* handkerchief; for it must be freed from even the slightest suspicion of grease. Even that left by the touch of a finger will prevent the size now to be used from lying evenly.

This size is a weak solution of isinglass—say, as much as will lie on a sixpence dissolved in a half-pint saucepan of water. The worker has to estimate the space over which his design will extend, to spread the size over it with a flat brush or with a little ball of cotton wool, and to lay on the gold at once. The design Fig. 33 is for bright gilding, the shaded portions being in deep, and the remainder in pale, gold. It is intended for the border of a blotting case or any similar purpose. As it is about an inch wide, a strip of somewhat more than an inch in width round the article will have to be sized, and to cover it a book of leaf gold may be cut through the middle—that is to say, into strips of an inch and a half.

Fig. 36.—Bright and Dead Gold in Combination.

In bright gilding the gold needs to be laid on with great care. If a leaf is found to be crumpled it is better not to use it, but to lay it by for future dead gilding. Different men have different methods, but the writer would not recommend the use of the tip for the work now under hand. In bright gilding it is desirable that all parts of the leaf should touch the size at once, or a crack will result; and he prefers to lay it on with the paper of the book, using *both* hands. The edge of each piece as it is laid should slightly overlap that of the preceding one. When all the space is covered, any cracks that may appear should be mended with fragments of leaf applied with the point of a penknife; and if the size should be too dry to hold the scrap of gold, it should first be breathed upon. Sometimes whilst the gilding is going on some part of the size may get too dry, and need sizing over again; if so, care should be taken not to let the size used flow over gold already laid on, or it will injure its colour.

The work will at first appear dead, but as it dries it will gradually brighten. Drying may be hastened, if desired, by holding the article moderately near to the fire. When the work is thoroughly dry and the article cool, breathe on the gilding, and with a ball of cotton wool press down the gold firmly but lightly. The pressure must be applied directly downwards, not obliquely, or there will be danger of disturbing the leaf. Then hold the work to the fire for a moment, warming also a fresh ball of cotton wool, and with the latter rub off all the little wrinkles, etc., which appear. By this the brilliancy will be greatly increased.

The pattern has now to be pounced

The Works Magazine Reprint Project (-) 2012 toolsforworkingwood.com

upon the gilded surface. after which (to protect so much of the gold as is intended to remain) the design has to be painted on it in asphaltum or brunswick black. This will need drying for half an hour in a tolerably warm stove, and then all unprotected gold may be wiped off with a piece of wet cotton wool. The design—that is to say, so much of it as is in deep gold—now appears as brown ornament on a black ground.

The work is now ready to receive the pale gold. If this occurs freely in all parts of the pattern, as it does in the example before us (Fig. 33) we must gild the whole—in this case our inch strip—over again; had it, however, been in isolated parts only, it would have been sufficient to have gilded patches covering those parts. All the gilding, pouncing, protecting with asphaltum, and cleaning away of superfluous gold have to be gone through as with the deep gold; and that done, we shall have our whole design, both in deep and pale gold, on the papier-mâché, but alike hidden under a brown covering.

To remove this coat of asphaltum is a simple matter. The article having first been slightly warmed, to soften the asphaltum, a ball of cotton wool has to be dipped in turpentine, and wiped lightly and carefully over the work. This will first result in a smudge merely, but a second wiping with *clean* wool and *clean* turps will have a more satisfactory effect. When first cleaned the gold will have a somewhat yellow look, from the turpentine; but a light rubbing with finely powdered whiting will remove the discoloration and bring out the full brilliancy of the gilding. In finishing a design like the present, it is usual, where forms in deep and pale gold cross each other, to separate them by black lines. The veins may be either in black or white. The shading may be in wash black; this looks better than burnt sienna, which is often used for the purpose. The thin line which bounds the inner side of the border should be either in colour or in dead gold.

The design might have contained other ornaments in dead gold, and these could well have been introduced after the bright gilding had been rubbed with whiting as above described. The whiting, by removing all grease, would have prepared the ground for them. The required ornaments would have had to be pencilled in with japanners' gold size, as directed under *Dead Gilding*. The introduction of dead gold in this manner often gives a pleasing variety. Fig. 36 is a design in which the two kinds of gilding are shown in combination. In this the plain, outlined ornaments are in deep bright gold, the shaded parts in pale dead gold, and the black parts in deep dead gold. It should be noticed that a narrow space is left all round the dead gilt parts, of which the result will be a black line (the original ground) separating the different parts.

Note.—If it should be desirable to tint either bright or dead gold at the extremities of a leaf or ornament, it will best be done by sizing the gold over for a distance with copal varnish, to which a spot or two of oil has been added; and when this is a little dry, by taking dust colour of the kind desired, and with a dry camel-hair brush dusting it on to the varnish and letting the colour die away. Of the process of "dusting" more will be said by-and-by. Also, if bright gold be used in combination with pearl, it is better that they should not actually touch; neither should bright gold be laid over pearl anywhere, as the pearl asserts itself through the thin leaf metal, producing a disagreeable and nondescript effect.

Silvering.—Silver leaf if applied as bright silvering is apt to have a "tinny" and cheap effect in papier-mâché work where it can only be used in small quantities; it is, therefore, more commonly applied as dead silvering. The process is much the same as that of dead gilding, except that, owing to its greater thickness and weight, silver leaf has to be laid on whilst the gold size is slightly more moist.

Leaf silver, like leaf gold, is bought in books, but these contain twice as many leaves and are larger—4½ in. square. A book of silver costs 9d. or 10d. In addition to the ordinary silver an iridescent leaf has recently been introduced, which has a rich effect of colour, and is worthy the attention of papier-mâché decorators.

A valuable use of silvering is to give brilliancy to transparent colours laid upon it, as for lighting up the stained-glass windows in interior views of churches, for imitating the lustrous eyes in peacocks' feathers, etc. Also for a class of illuminations known among japanners as "arabesques," in which the ornament is outlined in bright gold and filled in with patches of brilliant colour; and wherever a body colour sufficiently brilliant is not to hand, the method is to lay in with silver leaf, and to cover it with a transparent colour.

Arabesques.—Fig. 36 may to some extent serve to illustrate the arrangement of arabesque ornament. The black and tinted portions of this design may be supposed to represent the coloured spaces, some slight interval being left between the gold bands and the filling. Usually, however, japanners' arabesques are combinations of the kind of ornament seen in this design and that seen in Fig. 32. In this latter diagram, the black lines indicate outlines in bright gold, whilst the tinted spaces within represent the bright patches of colour, either opaque or silver leaf stained.

The colours used for staining the silver leaf are usually—carmine and crimson lake for red, prussian blue and ultramarine for blue, verdigris or a mixture of Italian yellow (sometimes called Italian pink) and Prussian blue for green (with verdigris a little Italian yellow is generally used to warm it), and for purple a mixture of carmine and ultramarine. It will be noted that the colouring is always kept a little within the gold outline, so as to leave a line of black between colour and gold. White is sparingly used in this kind of work; so also is yellow, which too nearly approaches the colour of gold, whilst emerald green is used freely.

In Fig. 36 the brilliant colouring is confined to the ground, but in Fig. 32 it will be seen that the ornament itself, though bounded by a *strong* outline in bright gold, is the portion silvered and coloured. The ground in this case may either be left plain black, or it may be picked in with dead gold, or with some colour which does not appear in the ornament.

These papier-mâché arabesques have little in common with what might more properly be called arabesque decoration, except brilliancy of colour and formality of design, and were probably suggested in the first instance by Cloisonnée enamels.

An additional use of silver leaf, often seen in very old work, was that of serving as an imitation of gold when washed over with Italian yellow.

It is not possible to beat out silver to so extreme a degree of thinness as gold; hence the greater thickness and weight of silver leaf; hence also its comparatively high price when the relative value of the two metals is taken into consideration. It would seem probable that in the old days when silver with a wash of yellow was made to do duty as a cheap substitute for gold, that gold leaf must have been very much thicker and therefore more costly than it has been in recent years.

The practice preferred by the writer with silver as with gold, is to lay the leaf on the sized surface with the paper of the book in which it is bought; some, however, may like better to apply both in the manner considered by gilders to be more orthodox, namely, with the tip. For the benefit of such persons it ought, perhaps, to be said that the tip is an instrument which the gilder commonly makes for himself. He doubles a waste playing card, and between its two thicknesses glues a thin layer of camel's hair, so as to make a kind of attenuated brush. This he uses by first drawing it over his hair, whence it gets a faint suspicion of grease, but just enough to cause the leaf to adhere to it and allow itself to be taken up, and so slight as at once to permit the leaf to leave it on coming in contact with the more sticky gold size. In gilding an uneven surface, the value of the tip in bringing the gold leaf equally in contact with the various parts will be obvious.

Embossing.—This, as practised by japanners in the palmy days of papier-mâché, was a method of producing the effect of dead gold slightly embossed or raised upon bright gold by one operation of gilding only. The parts intended to be in dead gold were first pencilled in with gold size on the bright surface of the papier-mâché, and when nearly dry were rubbed over with a "bob" dipped in bronze powder (usually pale bronze), and this resulted in the ornaments appearing in solid bronze. At this stage the work was dried in the stove, so as to render the ornamentation hard. Afterwards it was water sized and leaf gold laid over every part, and burnished in the manner before described, where the decoration was wanted. Sometimes the whole ground of the article was bright gold, on which lay the embossed gold ornament; at other times the bright was merely a bordering to the ornamental dead gold work.

The result of this process was that, where the gold leaf was laid upon the bronze, it appeared dead and slightly raised. Fig. 34 is intended to illustrate embossing. Black represents the portions pencilled in with bronze. In this case it is supposed that a bordering of bright gold only surrounds the embossed ornament. This is represented by the tinted parts. The method of forming such a border was by pencilling over the gilding with copal varnish. So far as it extended, the varnish protected the leaf beneath it, and the superfluous gold could then be wiped from the remainder of the surface with wet cotton wool.

It is sometimes desirable, especially in borders, to represent leaves in bright gold, with fibring and turnovers in dead gold as in the design, Fig. 35. The process is exactly that last described. With some designs pouncing has to be employed first for the embossing, and again, after gilding, for the copal-varnish pencilling. The reason for using varnish and not asphaltum, as in ordinary bright gilding, is that the turpentine necessary to remove the asphaltum would be liable to disturb the embossing. In Fig. 35, the black portions, including the fibres of the leaves, will show as dead gold, and in finishing the work the interlacing portions are carefully divided by a line of black.

The Works Magazine Reprint Project (-) 2012 toolsforworkingwood.com

OUR GUIDE TO GOOD THINGS.

62.—MESSRS. HARGER BROTHERS' SPECIALITIES.

I HAVE received very recently the latest edition of the catalogue and price list of fretwork materials and appliances of various kinds used in making and fitting up ornamental work, issued by Messrs. Harger Brothers, of Settle, Yorkshire, and sent, I may say, to any applicant, post free, for 6d. Messrs. Harger Brothers' establishment in Settle may be regarded as the chief emporium in the northern counties for the supply of these articles, and as such is well worthy the attention of all retail dealers in such goods, as well as of all professional and amateur workmen who make them—the one, possibly for profit; and the other, certainly for the honour to be gained for successful achievement.

It will be useful to give an extract from a letter recently received from Messrs. Harger Brothers, as it shows what they can do and will do far more effectually than anything I might be led to say on this point. They write:—"We may say that we usually send goods the same day as order is received. Our patterns (that is to say, for fretwork, etc.) include many not in miniature, and our stock includes some hundreds of thousands for the wholesale and retail trade. We have noticed inquiries for timber for fretwork in WORK: this we cut and plane on the premises by machinery, and can make any special moulds or turning which amateurs require. We also hold enormous stocks of veneers and all fancy woods for carving or turning, and can cut to any special sizes. We also make a speciality of hinges, fasteners and fittings, locks, etc., for small boxes, cabinets, etc., and are large importers of the best American fretwork machines. Carving tools we supply all shapes."

Catalogue and Price List.—I will now proceed to notice such articles as have been sent me by Messrs. Harger Brothers as specimens of their specialities, and may well begin with a few words with regard to their price list, sent, as I have already said, post free for 6d. It is a large quarto pamphlet of 64 pages, and contains illustrations of most of the tools and appliances comprised in their stock with prices, etc. On the second page of wrapper useful instructions and recipes for various kinds of work are given, and on the fourth page an ample index to its various contents. Pages 1 and 2 are devoted to remarks on patterns, woods, machines, terms, etc., and testimonials from home and abroad. Then follows description, prices, and illustrations of fretwork goods and articles kept in stock, conspicuous among which is the page devoted to carving tools, in which is shown not only the shape of each tool, but its full-size form at the cutting edge, or, in other words, the shape of the incision that may be made by pressing the edge against a piece of wood. To enter into a specification, even of the classes of goods described and figured, is simply impossible, and it will suffice now to call attention to Harger's "Patent Adjustable Bench Stop," a useful and time-saving adjunct to the carpenter's bench. Fittings of every kind for cabinet work, fretwork, etc., hinges of all kinds, draw-pulls and handles, are abundantly illustrated; and the last 22 pages of the price list are filled with miniature reproductions of most of their fretwork designs, which is of the utmost utility in enabling any would-be purchaser to form some idea of the character of the design, before sending for the actual design itself for pasting on the wood. Those who send for the catalogue will find, I fear, that my brief *résumé* of its contents falls very short of the mark.

Designs for Fretwork, Carving, Inlaying, etc.—That the taste and liking for fret sawing has been greatly on the increase of late years is amply evinced by some of the recent designs of Messrs. Harger Brothers, which, when cut and finished, work up into large and elaborate pieces of furniture, many of them bearing the mark of having been produced by skilled designers. No. 675 is a handsome hall ornament, consisting of a bracket, with mirror at the back rising above it, contained in an elaborate frame, flanked by equally elaborate wings or side pieces. No. 679 is a quaint emblematic design for a calendar, in which are figured the signs of the zodiac, and which, by means of index hands, shows the month, the day of the month, and the week. No. 673 is a sideboard, the patterns of which extend over five large sheets, containing many parts and panels which might be utilised in a variety of ways. Bold, venturesome, and persevering must be the man who attempts to cut it. No. 676 is a work-box of Indian design, to be cut in ebony backed with white holly. No. 606, a clever design for an overmantel; and No. 609, a design for a newspaper rack or waste-paper basket. The only thing that is lacking in some of these is a representation of the article itself when made up, which Messrs. Harger Brothers will, doubtless, supply in future reprints. The patterns for inlaid work are well conceived, particularly No. 654—a round table top, ornamented with shells, birds, and foliage, and buds and blossoms of the passion flower. No. 648—two paper knives for inlay—is also good. Of the carving patterns, the most noteworthy is No. 580, a bold and well-executed wall bracket, which would present an effective appearance on completion.

Hinges and Cabinet Fittings.—Messrs. Harger Brothers also send many good samples of strong hinges of polished brass for fretwork fittings of various sizes, ranging from 1½d. to 1s. 9d. per pair, according to size, stoutness, and pattern. These are what may be termed fancy hinges; but brass or nickel-plated hinges of the ordinary form, from ½ in. to 1¼ in. in length, may be had from 1d. to 3d. each, according to size. In addition to these are some good gilt or nickel-plated fasteners for boxes or cabinets, from 4d. to 6d. each. Knobs for drawers and feet for box or tea caddy are also supplied at cheap rates, the former, in bone, ¼ in. in diameter, being 1d. each, or 8d. per dozen; and ½ in., 1½d. each, or 1s. per dozen. These fittings will be found illustrated in pages 8, 9, 10 of the catalogue.

Samples of Fretwood.—Lastly, I will call attention to the fretwood that is stocked by Messrs. Harger Brothers, solid, in boards of various widths, according to the wood, and of thicknesses ranging from ⅛ in. to ⅜ in. Samples of almost all the different kinds of wood kept in stock have been sent to me, and all seem to be well seasoned and of the best quality. Many of the woods are supplied in the form known as "three-ply wood," which consists of three thicknesses of wood glued together, the grain of the intermediate layer being transversely to the grain of the exterior pieces. I need scarcely say that any thickness of wood prepared in this way is far less liable to fracture than solid wood of the same thickness, and should be used in all cases when the design is intricate and extends over a large area. Samples of various kinds of fretwood about 2 in. square, numbering about twenty kinds, are sent out, post free, for 2s. The possession of a set of samples enables the fret sawyer to decide more readily on the kind of wood he will use for his work.

63.—MESSRS. GIBBONS & CO.'S SPECIALITIES.

I have received from Messrs. C. Gibbons and Company, 2, Avenell Road, Highbury, London, N., some specimens of the specialities in which they deal, and which they make themselves. I will notice these presently, but before coming to this part of the subject, let me say that I am more especially pleased to be asked to speak about Messrs. Gibbons and Company's goods, because they are the first working dealers, if I may be permitted to put it so, who have come forward to ask for a notice in WORK. Now WORK is essentially a working-man's paper, and I see no reason why the productions of working men should not be mentioned and described as well as the more elaborate and costly goods of the manufacturer on a large scale. I mention this here with some degree of emphasis because some persons seem to labour under the idea that WORK is an advertising paper, which means, when translated into plain and unmistakable language, that notices in "Our Guide to Good Things" are paid for. A greater mistake was never made. Everything that is noticed is noticed on its merits, and on its merits alone. Only such things as are sent for notice are reviewed in "Our Guide to Good Things," and to me there is as much pleasure in mentioning a tool, appliance, or article for sale made by the humblest workman, as in calling attention to costly machinery from the factories of the first makers in the land.

Scratch or Bead Router.—Messrs. Gibbons and Company send a very nicely made scratch or bead router with four cutters, being led to do so by the article on this subject by Mr. David Denning, which appeared in No. 7. Of this they say:—"The article on the bead router was just what was wanted. We make and have sold many of them, and I beg to hand you one for your inspection. We supply the scratch stock and four cutters for 2s., and extra cutters at 2d. and 3d. The stock, which is 8 in. long, 1½ in. broad in the widest part, and ¾ in. in thickness from side to side, has a nicely shaped handle, and is well finished. The carrier for the cutter is clamped by three brass screws, having heads pierced with a hole to admit of their being turned by a lever in the form of a short piece of stiff wire." So handy do I find this scratch, and so little time have I for making such appliances for my own use, that I retain it in my possession, sending Messrs. Gibbons & Co. its value in stamps, for as they sell these things, the money value is as good to them as the scratch itself.

Small Mouldings.—Of these Messrs. Gibbons and Company write:—"We also send you samples of small mouldings. It is at very few places that these can be got so small in size, and we have much pleasure in drawing your attention to our samples; we have them in stock from 1d. per foot." Of these mouldings fourteen patterns have been sent neatly glued on a board. They range in width from $\frac{2}{16}$ in. to ⅞ in., and are sold at prices ranging from 4d. to 1½d. per linear foot. They appear to be made with the scratch and cutters used with it, and will be found useful, I think, by many who require this sort of thing for small work, but cannot find time to make mouldings for themselves.

Violin Clamp.—Another speciality of Messrs. Gibbons and Company are violin clamps, of which a specimen is sent that is supplied at 8d. The parts of the clamp, which are ⅜-in. square, are firmly connected by mortise and tenon, and in the lower arm is a screw, by which the clamp is tightened or loosened as may be required.

Samples of Fretwork.—Messrs. Gibbons and Company are also fret cutters, and in submitting some specimens of their work, they say:—"We send you samples of our fretwork to show you we are practical men at this sort of thing, and we shall be most happy to help any reader of WORK who may want help in this sort of work. We feel competent to give advice from the long experience we have had, Mr. Gibbons, senior, being one of the first, if not the first, of the earliest workers in fretwork who used to do the work for Moseley and Simpson." The fretwork consists of four panels, well and carefully cut.

64.—FALLOWFIELD'S PHOTOGRAPHIC ANNUAL, 1889.

This well-printed volume of 336 pages constitutes for the present year the "Photographic Annual and Comprehensive Catalogue of Photographic Materials, Chemicals, and Apparatus," together with "Complete Working Formulæ for most of the Photographic Processes." This is issued by Mr. Jonathan Fallowfield, South London Photographic Stores, 35 and 36, Lower Marsh, and 86 Oakley Street, Lambeth, S.E., and will be sent by him post free to any applicant on receipt of 1s. It has all the appearance of being a sufficient directory to everything that a photographer ought to know or ought to require in the way of apparatus and appliances for the prosecution of the art of photography. To attempt even to summarise the contents of this volume is simply impossible, and it is enough to say that no photographer, whether professional or amateur, should omit to find a place for it on his shelves. The value of the book is enhanced by a good index; and another noteworthy feature is a list of agents at the end, in which a great number of towns, chiefly English, are arranged alphabetically, and under each the name given of one or more agents resident therein, who supply Fallowfield's photographic goods.

THE EDITOR.

The Works Magazine Reprint Project (-) 2012 toolsforworkingwood.com

SHOP:

A Corner for Those who Want to Talk It.

*** All Communications will be acknowledged, but Answers cannot be given to questions which do not bear on subjects that fairly come within the scope of the Magazine.*

I.—Letters from Correspondents.

Cabinet in Fretwork.—Electro writes:—"I have very great satisfaction in endorsing to the utmost the opinion of the many correspondents who have testified to the value of Work. From the first number I have looked forward to its appearance every week with much pleasure. I have begun and nearly finished the cabinet in fretwork from Mr. White's designs. It has occupied nearly all my spare time, but I am more than repaid for the trouble I have taken, although, probably, a practical cabinet maker would shudder at the result; but I have got on with it much better than I could have expected considering my lack of experience."

Copying Fretwork Designs.—Electro writes:—"Possibly some of your readers—beginners like myself—do not know an easy way of taking copies from fretwork. Here is a little 'wrinkle' I learnt the other day. Hold a piece of thin white paper firmly over the design to be copied, then rub it all over with a piece of common shoemakers' heelball; the design will come out black, and will be an exact copy of the fretwork underneath. Of course I am speaking of the actual fretwork, and not the paper patterns."

Sounding Board for Dulcimer.—T. C. B. (*Birmingham*) writes:—"I quite agree with Dulcimer when he says the proper dimensions of a sounding-board for a dulcimer would be welcomed by many subscribers. It is what I have been waiting for. I have made two attempts at the same thing, and done fairly well, but I have had to guess the angle by seeing them in the shop windows. The body I construct according to my own idea; the only trouble I have is to get the proper length of the strings or the proper angle (as Dulcimer speaks of); this is all that is wanted, I think, by an amateur. And this, I think, could be given by a piano maker, as they are constructed on the same principle as a piano. I have seen it announced that articles will appear on piano making, which I have been waiting to see, so that I could glean what I wanted from them. Now that the subject is started I hope some professional dulcimer maker or piano maker will hurry up, and let us amateurs know what we want to know."

Sharpening Carving Tools.—H. C. (*Lincoln*) writes:—"I notice in Work No. 11, a suggestion that the slips for sharpening carving tools be held in the hand screw. Allow me to present another way. The appliance is made out of any hard wood in a few minutes; the sketch shown in Fig. 1 explains itself. It is not usual, I believe, to have a bench vice on a carver's bench, so the appliance for holding slips may be quickly held by the modification of bench screw known as 'hookey,' which I suppose is known to all carvers. I am pleased to

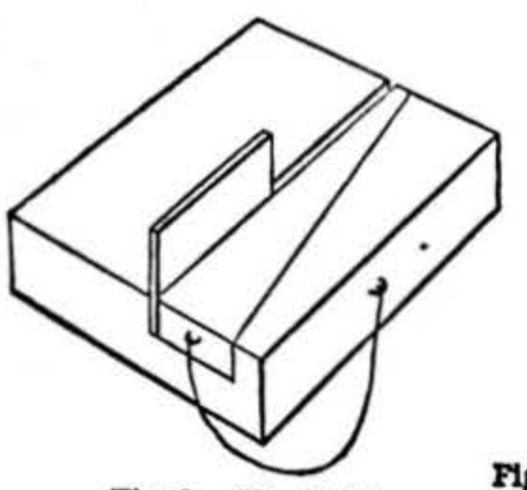


Fig. 1.—Slip Holder.

Fig. 2.—Carver's Holdfast.

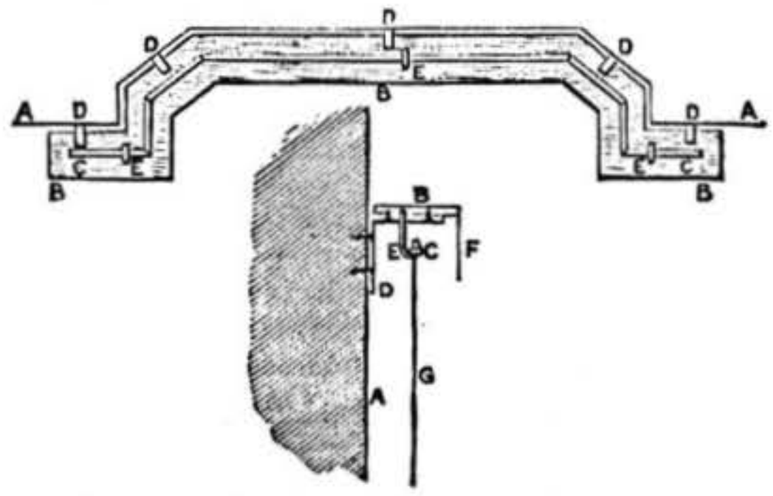
see the wide scope of Work. As an amateur in many branches besides carving, I welcome the paper as supplying a want I had felt for many years. I have seen it in many working men's houses, yet often alas, torn! I trust we shall be taught how to bind it ourselves. To return to the subject of carving, I look forward to seeing some good designs in Work. A mantelpiece with side panels in good Italian Renaissance work, not too complex, or a Gothic sideboard with tracery panes at the back and a canopy, would be delightful! I do not mean detailed instructions, but a full-page design, with or without a little letterpress. In conclusion, let me wish a long and prosperous life to Work."

Papier-Mâché.—Disappointed (*Soton*) writes:—"I feel rather disappointed that the articles on papier-mâché have been discontinued for several weeks; have they come to an end?"—[Disappointed will see ere the publication of this that the papers have been resumed.]

About Work.—S. F. (*Gulval*) writes:—"For many weeks past (in fact, ever since I received the first number of Work) I have intended to offer my humble congratulations on your having brought out such a valuable magazine as Work. I have watched with interest from week to week the many expressions of praise bestowed on it, coupled with suggestions of improvement by my fellow-readers, but after having seen a paragraph in 'A Corner for Those who want to Talk it,' by T. J. H., which finished by asking his fellow-readers' opinion on it, I felt I could no longer refrain from sending my views respecting Work and T. J. H.'s views. He says the most tantalising of your publications is Work. Now, sir, it appears to me that some of the readers of weekly and other papers seem to think that every week there must of necessity be an article published to suit their respective requirements, according to their calling or occupation; and should one of these articles be too long for insertion in one number, it must be continued in the next issue. This I do not agree with; for instance, take the article by Mr. Adamson on 'The Screen Secretaire,' or 'Some Lessons from an Old Bureau.' Supposing, in consequence of other articles in other branches being published, neither could be continued for two or three weeks, was there not enough contained in the first part of either sufficient to impart knowledge to any reader intending during spare hours to make one to go on with until the article should be concluded in a subsequent issue? Certainly. T. J. H. says your present method is 'like feeding a lot of donkeys with one oat at a time, each donkey waiting his turn to get his oat.' Is it not much better to take a little good food at a meal, than to overload one's stomach with a large quantity which would produce indigestion? For my own part, I think that to find fault with the method now carried out by you is utter selfishness; indeed, what paper is there, whose custom it is to publish, say, a serial story, would for a moment (to gratify the wishes of a few readers) think of filling two or three issues following with it, and then for a week or two go on with general news? The success of that paper would be doomed, as would Work, if it should adopt that policy. Then respecting his suggestion to enlarge Work, and, consequently, its price, I say adhere to its present size and the penny. I once took a weekly journal which, when it first came out, was one penny, but after two years it was enlarged by the addition of tinted covers and a couple of extra leaves, and double the price. This, in my case, as I believe in many others, led me to discontinue my subscription. I believe your motive is to give knowledge to those who require it, and there is no better way in doing so than publishing a cheap weekly journal such as Work. Then, again, T. J. H. mentioned about Work, with others, being thrown out of a train on a dirty platform. Well, has this every-day occurrence in any way injured the copy of Work that he happened to buy? If it has his, I have found all mine to be as clean as when they left the publisher's office, although I happen to live near to the last country town in England. Whenever I have seen newspapers thrown on to a platform, I have seen that they have been bound with brown or other paper. I don't know that newspapers require to be very carefully packed, and labelled, 'This side up, with care,' and I doubt if T. J. H. can give an instance when he has seen newspapers in any way injured by delivery from the train. Well, sir, being a mechanic, and having charge of engines, I am glad your 'Corner' is open to questions, etc., in my calling, and that at any time I can get information from you, and some of my clever fellow-readers. I consider Work as it is just the paper that is supplying a long-felt want among artisans and amateurs generally. I wish you and Work the greatest prosperity."

About Work.—T. O. P. writes, in reply to J. P. A., page 188:—"With your permission I would like to say a few words in reply to J. P. A., in issue of June 8. He says, in reference to Work, 'I find it almost useless to practical men.' J. P. A. must be a most unusually practical and know-everything kind of man when he finds the combined knowledge of so many other practical men as subscribe to Work almost useless; and would it not look better in J. P. A. if he would help brother-readers to a little of his superior practical knowledge instead of wasting three-fourths of a column of what is 'valuable' space to others, whatever it may be to him; or was it all a preliminary blow-off to partly obscure a free advertisement at the end of his epistle? But not content with that, he must tantalise us by leading us to expect valuable information of how to make up a superior saw bench to any in the market, made up of odds and ends and anything that comes handiest, and winds up with 'it is about to be patented,' and cannot be described till that operation is performed (another prospective advertisement, I presume). But why does he say that iron planes, for instance, can be 'bought cheaper than made' (when the writer of those valued articles informs us they can be made for about one-fifth or one-sixth the outlay), and yet evidently thinks that one of the merits of his saw bench is its home-made nature out of odds and ends lying about (as of course it is)? I have a smoothing plane (iron) which cost 25s., but I have no doubt I could make one for 5s. outlay, thanks to the esteemed information in those articles; and not only that, but special work requires special tools, which are not to be bought, but can only be made to order at prices at which J. P. A. may or may not know something about; whereas a worker may make use of his 'odds and ends' of both materials and times, get his castings at a nominal cost, and again fit up at spare moments to his own satisfaction, and which he may even still have to do after paying a toolmaker a lot of money for his idea of what the requirements may be. But with those instructions on the standard articles he can easily alter to his own requirements; and, unfortunately, we have not all had the vast practical experience in every branch of work that J. P. A. has had the advantage of (has he had two or three lives to acquire his great practical experience in?). If J. P. A. wants more of Dr. Dresser's, why not go to the great Doctor himself? Some of us at least would rather be excused more of his outlandish teapots and candlesticks, or building construction. Surely there are plenty of periodicals devoted to that branch for J. P. A.'s requirements without his wanting to carry off 'our' paper as well; or 'for good old or new furniture' why cannot he be content with his *Cabinet Maker*? But I presume J. P. A. would have a paper more of a general character made to suit his own special requirements, at the same time to be vastly superior to all the specialists. He says the '*Cabinet Maker*, though cheaper, has much more information.' How cheaper, when it costs 1½d. to 2d. per month more than Work? Now, Mr. Editor, I have some fifty monthly numbers of that work since its commencement, and had the reading of many of the others; also a big pile of the other trade organ; but I find Work gives more information than either, if not both the others, to workers, though perhaps not to window dressers and counter jumpers and masters, and consequently am giving up both the others in preference for Work; and therefore hope you will not make such sweeping changes as J. P. A. would have, even if we have to lose the support of all such practical men of his type. I must apologise for this long letter, but I would like you to have a little encouragement from the other side than that of carpers and grumblers, who are never pleased with anything outside themselves."

An Amateur's Cornice.—W. B. B. writes:—"Observing in your issue for 27th April a description of a cornice (see page 83), I venture to send a plan which I adopted last year, and found to answer perfectly what I wanted. It is, I think, very much simpler to put up, and to some tastes would be as effective as the design of your contributor, Olla Podrida. At all events, any one who can handle a screwdriver, and a hammer and tin tacks, can try it at a very trifling outlay. The first requisite is an iron curtain rod with holes at each end. These can be purchased at any ironmonger's for a few pence, of such length as may be requisite. The rod should be suspended by iron hooks screwed into a ½-in. board, and the board must be fixed over



the window on iron brackets screwed into the wall. The board holds the rod, and the rod will allow the curtain rings free play. In front, and at the sides, tack a piece of tapestry, which may be purchased at the draper's, to harmonise with the curtains, to conceal the rod, and the matter is complete. Where the window is flat the matter is perfectly simple; and in the case of a bow window, a little more ingenuity is requisite, but no more than any intelligent man can overcome. The principal difficulty in the latter case is to procure a bent rod of the requisite size, and to cut the boarding to the proper shape. Any ironmonger will procure the bent rod, but the measurements require to be carefully taken. I add a couple of sketches to explain what I mean. The same plan would, of course, answer for a curtain over a door. In conclusion, I beg to offer my compliments on the work you are bringing out. Personally, I should be glad to see some wood carving designs, especially in Renaissance work, but recognise that you cannot do everything at once."

Building Construction.—C. M. (*Leicester*) writes:—"In answer to your request for the readers of Work to express an opinion on the subject of building, I think the way you suggest will be the best—in beginning from small houses. Hoping that you will be able to give early attention to it, I trust that your paper will be a success, as it has supplied a long-felt want."

Ammonio-Citrate of Iron.—P. W. S. (*Poplar*) writes:—"In an early number of Work I note 'ammonia, citrate of iron,' or something similar, which had misled a correspondent, and had been corrected by omitting the comma. But I submit the form is still incorrect, though I know often used. 'Ammonia-citrate' is as incorrect, in my view, as 'Russia-Turkish war' would be, the true phrase being 'ammonio-citrate,' not forgetting the hyphen."

An Opinion on Work.—W. V. C. (*Dublin*) writes:—"As a reader from the first number, I think I may venture to write with the object of giving my opinion on your paper. In the first place, the greatest fault (if it is a fault) your paper has, in my eyes, is that most of the articles are far above my head, and are apparently intended for skilled artisans. I think there ought to be a medium between this and the opposite extreme of presupposing your readers knew nothing whatever,

The Works Magazine Reprint Project (-) 2012 toolsforworkingwood.com

and giving a definition of a hammer as an instrument for driving nails, etc. Possibly your paper is not intended for amateurs; in fact, your first number, which of any paper is usually taken as a forecast of its future line, contained as its leading article 'A Cabinet in Fretwork for Skilled Workmen.' In every other important particular I consider your paper admirable, the supplements and illustrations being particularly good. I will certainly continue to subscribe to WORK, in the hope that I may advance in knowledge, and that it may come down to my level. While I think advertisements of tools, etc., not uninteresting, I do not think they ought to encroach on the pages of the paper, but should be on a separate cover, as in *Tit-Bits*, etc. I hope, too, that at some future time you will see your way to have the paper cut and stitched. I have induced a good many of my friends to take in WORK, but some have dropped off for the first objection I have made. I trust, however, that I may soon have reason to ask them to rejoin. I would suggest your sending specimen copies to the reading room, Mechanics' Institute, here, and also to the workmen's clubs at Wellington Quay and at York Street, and to the Corporation Library; at all these places they would come under the notice of the class of people most interested. The addresses given will find them."

II.—QUESTIONS ANSWERED BY EDITOR AND STAFF.

Sheffield Steel and Wire Gauge.—J. H. (*Sheffield*).—I am not aware that there is any gauge known specifically and authoritatively as the "Sheffield." But I suppose that Stubs's gauge is meant, termed also the "Warrington" and the "Lancashire," this being largely used in Sheffield. In any case, the origin of all the old gauges is a matter of surmise only. No one can say with certainty how any of them originated, but a great deal of research and discussion have been expended over the question. The Committee of the Society of Telegraph Engineers, which was appointed to report on the Birmingham wire gauge, concluded—and they based their conclusion on the opinion of specialists—that the Birmingham wire gauge, in common with others, originated as follows:—Beginning with No. 1 wire, which is the largest, each successive size corresponds with a single draw of the wire through the plate, so that No. 10 wire, for instance, would have passed ten times through the draw-plate. Practical, and not mathematical, considerations, therefore, determined the sizes of the early gauges. The manufacturers would naturally draw down as small as possible at one operation in order to save labour; but they would be limited by the strength of men, and by the machinery in use in the last century, and by the cohesive strength of wire. As bearing out this theory, it is found, on investigating the series of sizes, that nearly a constant relation exists between the breaking strength of each wire and the resistance opposed by the draw-plate in drawing it down from its original diameter. Stubs's gauge, in common, probably, with all the older gauges, originated in this way. In 1843 Mr. Charles Holtzapffel, in conjunction with Mr. Peter Stubs, of Warrington, accurately determined the sizes of the best gauges in Mr. Stubs's possession, and formed a table of them. Mr. Stubs adhered to these averaged and determinate sizes, and it is from these that the tool makers of Lancashire and Sheffield have extensively copied. It is only during the last few years that Sir Joseph Whitworth, Messrs. Mallock and Preece, Latimer Clark, Robert Briggs, Mr. Hughes, and others, have proposed, or made, gauges based on strict mathematical principles, and in which either weight, or area, and diameter follow in a simple series of gradations. The outcome of these efforts is seen in one direction in the legalisation of the new standard wire gauge. As to the second portion of your query, it seems to me simply a question of mensuration. Knowing the weight of a square foot of steel sheet of definite gauge, which is supplied in tables, you can easily see how many times that is contained in a sheet of given length and breadth. Something more would be allowed for shearing off the edges: how much would depend on the practice of the rolling mills.—J.

New Adjustable Callipers.—D. R. M. (*Dundee*).—I do not happen to know the name of the maker of these useful callipers, but in reply to your inquiry as to where they may be got, I may say that they are sold by Messrs. R. Melhuish and Sons, 85 and 87, Fetter Lane, London, E.C. I think if you were to bring the notice under the attention of any enterprising tool and hardware merchant in Dundee, he would soon find out by whom they are made, and add them to his stock.

Cutting Edges and Bookbinding.—C. E. (*Hepburn-on-Tyne*).—I presume our friend, C. E., wants to cut the edges of his periodicals; if so there are three methods open to him. If he can get access to one or other of the first two methods to be named he will have his periodicals exactly as he wants them—viz., "to resemble work from a binder's hands." First, cut them with the cutting machine used by binders. Second, cut them with a binder's plough. To do this, the books will have to be screwed up tightly in a press called by binders the "lying press." The third method is a makeshift. Get a piece of deal board a little longer than the book to be cut, and about the breadth of ordinary flooring; plane one edge perfectly straight to serve the purpose of a straightedge or "cut against;" a few heavy weights, and a shoemaker's knife sharpened at the point. Make the book perfectly straight (which by this time must have been sewn) by knocking the back on a flat table. Having decided how much is to be taken off the edges, lay the board on the book in a position to guide the knife and place the weights upon it; take the knife in the right hand and cut close to the board. It will be well to keep the left hand on the board while cutting. Care will have to be taken to cut straight down—the knife will be liable to cut in. Book edges are not polished; they are burnished; and as this operation requires costly apparatus, I would advise C. E. not to attempt it. The edges can be sprinkled with Venetian red mixed with water, to which a little flour paste has been added. If C. E. succeeds in cutting his edges, the sprinkling will be an easy matter, and they will look as well unburnished as otherwise.—G. C.

Old Gold and Frames.—A. E. F. (*Leigh*).—As old frames require a deal of work and variety of treatment, I would suggest your waiting until this subject can be treated in the pages of WORK.—G. R.

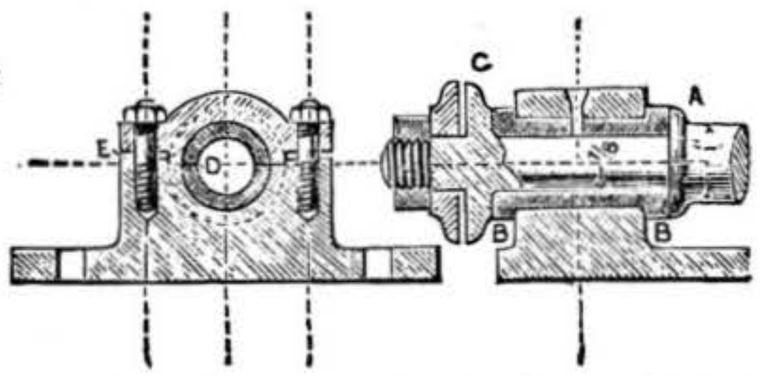
Handrailing.—TANCRED.—My writer on handrailing is a working man, and one of the cleverest workmen I know in carpentry, joinery, and cabinet making. Like most of his trade he must make hay while the sun shines, or, in other words, work when and where he is wanted, so just at present his papers do not progress at the rate I should like. Even the practical work that I want him to do for me must wait, for the bigger builders' jobs must of necessity be done first. So I must ask you to be patient and abide his time, as I do, and I can assure you that when the papers appear, the simplicity of his system will amply reward you for waiting.

Bricklaying, etc.—A. S. (*Battersea*).—Bricklaying and house joinery will be fully and comprehensively treated in WORK, but it is not possible for me to tell you "where you could get a thorough practical knowledge of bricklaying and house joinery at a small outlay, and the time required to obtain such knowledge." Practical knowledge can be acquired only by practice and by actually engaging in the work. You can learn the theory of bricklaying from books and articles, and how to distinguish between English bond and Flemish bond, etc. etc., but proficiency in actual work you can only attain by doing the work itself. With regard to house joinery, see papers on the "Joinery of the Workshop," which are about to appear.

Back Numbers of WORK.—W. B. (*Enfield*).—Back numbers of WORK are, and will be, always kept in stock, and you have only to order No. 6, or any number that you require, through the newsagent from whom you usually buy your newspapers and serial publications. I am glad you can say:—"I had the first number of WORK placed in my hand by chance. Being pleased with it I have continued taking it in, and my pleasure in it has greatly increased, and I think it will in time surpass any other paper of the kind—in fact I think it does so now." (So do I! ED.). "I forgot to buy one number—No. 6, I think—and should like to know if I can obtain back numbers, and from whence."

Quarter-Plate Camera.—CAMERA (*Charlton*).—An exhaustive article on the subject is now in course of preparation; the camera will be the first appliance treated upon. The idea will be to select the most simple and useful types of all appliances at present in use, accompanied by working drawings.—E. D.

Spindle for Circular Saw.—MONA.—The two figures annexed give a detail of the bearings of the saw spindle on page 141. Replying to your specific queries, A is a collar forged solid on the spindle, there being one against each inner bearing face to prevent endlong movement. B B are the flanges of the plummer block brasses, confining the brasses



endways, and affording broad-bearing surfaces for the collars of the spindle. C is forged solid and turned with the spindle. Wear is taken up by filing a little from the joints, D, of the brasses, as much as happens to be required, and screwing down the cap of the plummer block, which is made open at E for the purpose. The surfaces of the pulleys in the figure on page 141 are made round in order to prevent the strap from slipping off, because a belt must run to the largest diameter, and will only leave it when the stress of the work put upon it overcomes its power. That which you take to be a collar behind the flanged pulley is the boss on the back of the pulley, cast with it, and standing out a little beyond its back face. The drawings are to scale.—J.

Where to Buy Gold Leaf, etc.—W. S. W. (*Hummingley*).—Books of gold leaf and also of imitation gold or "Dutch metal" may be obtained at any oilman's or shop where painters' requisites are sold.—OPIFEX.

Wire Thread Fret Saws.—W. B. (*Enfield*).—On inquiry I find that these saws are not yet in the market: as soon as they are I will mention prices, sizes, etc.

Hand Saw.—H. A. G. (*Rugby*).—You ask, "What is the use of the little knob at the end of a hand saw, which projects above the blade at the end of it?" It is of no use whatever; it is merely ornamental, and is introduced, I take it, merely as affording less abruptness in the transition from the broader to the narrower part of the blade. The decrease in width from heel to end of the saw blade tends to lighten the weight and render the saw more manageable, if I may so speak.

Boat Building.—G. H. (*Cork*).—This subject will be taken in hand at an early date, or rather when summer has given place to autumn. Probably the canoe will be the first boat described, but in due time all kinds of boats for rowing and sailing will be described, and the mode of building them.

Model Sailing Vessel.—W. R. (*Wigston*).—Kindly see preceding reply relative to boats and canoes for fresh and salt water. You wish for a model. Will you write again and give some idea of the size and state the rig you desire? There will be no difficulty in getting papers on the subject; but the writer would naturally like to know the taste he has to suit.

Cement for Repoussé Work.—S. H. E. (*Plymouth*).—Mr. Gawthorp's paper on "Repoussé Work," in No. 7 of WORK, is in no way intended as an exhaustive description of the process. It was merely an accompaniment to the pattern sheet given with No. 7, and to serve to show the reader roughly and briefly the broad outlines of treatment. Mr. Gawthorp will go into details in papers that he has undertaken to supply on this beautiful and attractive art. He will readily supply you or any other workman, professional or amateur, with everything necessary for doing the work, and will tell you how to make the cement. I append the recipe you kindly send, and which, you think, has never been published. It is:—"9 lbs. of emery or fine brickdust, and emery in equal parts; 2 lbs. of pitch, 1 lb. of resin, 1 candle, or its equivalent in tallow."

Broken Film in Developing Plate.—A NOVICE (*Norwich*).—Procure a tube of neutral grey, moist water colour, and then with a fine sable pencil carefully stipple over the defect until by *transmitted* light the patch is the same apparent density as the surrounding parts. It will be as well to varnish the negative first, then if the stipple has to be removed, it can be without further damaging the film. An experienced retoucher would do it before varnishing; it is a mere matter of practice to judiciously match up with the image. NOVICE had better try repeatedly until he succeeds. It is always best to stipple it too thinly than too much. A light patch in most photographs is more conspicuous than a dark one in the resulting print.—E. D.

Maple Varnish.—H. W. G. (*Stourbridge*).—I have never heard of this varnish being of a rich crimson colour. Maple varnish is of a pale colour, so that yours has either been reddened or is incorrectly described. In either case I should hardly advise you to shake up the sediment, though if this is "sugary" I cannot speak positively. I fancy, however, you must be mistaken about its saccharine qualities, as I do not remember any varnish of which sugar is usually an ingredient.—D. A.

Simple Measurement of Timber.—C. F. (*Bradford*).—The simplest method of measuring round timber is by the "Quarter-girt" system. Required the cubic contents of a tree 30 ft. long and 96 in. in circumference.

Circumference 96 in. Quarter-girt=24 in.
Quarter-girt 24×24=576
30 ft. long

Quarter-girt divisor 113)17280(152 cubic ft.
113
598
565
330
226
104

Answer, 9 ft. short of 153 cub. ft.;
or, according to "Hopper's Measurer,"
Quarter-girt 24×24 in. =576
30 ft. long
divisor of 12×12=144
144)17280(120
144
288
288
0

A difference of about 22 per cent.—A. G. H.

Wood Stains.—FRENCH POLISHER (*Maida Vale*).—There is no book which I could unhesitatingly recommend, but the "Practical Guide to French Polishing," published by Wyman & Sons, is, perhaps, the best. The subject will be fully treated in WORK as soon as possible; meanwhile the following suggestions will be of use to you:—Yellow—Methylated spirits, 1 pint, turmeric, 4 oz.; or water, 1 qt.; picric acid, 1 oz.; ammonia, 1 oz. Blue—

The Works Magazine Reprint Project (-) 2012 toolsforworkingwood.com

Solution of indigo in sulphuric acid diluted to shade. Greens of various tones by mixing blue and yellow in different proportions. Red—Decoctions of alkanet root, logwood, and kindred dye stuffs. You will find it far better to buy your stains ready made. A large variety of stains may be made from the aniline dyes which you can buy either dissolved or dry. W. R. Roberts & Co., Earle Road, Liverpool, manufacture some excellent wood stains in all colours.—D. A.

Books of Japanese Fret Designs.—P. E. (*Ebbw Vale*).—I was very interested in your letter, but to comply with your request is not possible, for, alas! I know of no real books of Japanese fret and carved designs. I own some hundred native books, and the few motives for such patterns therein are already reproduced in WORK. I have designed many which I fondly hope are not those mongrel ones you have obtained at emporiums. I have seen such, that made one blush for the artistic depravity of their draughtsmen. You have had a chequered career, and should be a master of all trades and Jack of none—some day. May you reach 6 ft.—J. G. G.-W.

Removal of Paint from Plaster Cast.—A WHITESMITH (*Norwich*).—Should the removal of the black paint at present on the cast be absolutely necessary, a strong solution of American potash may be made and some sawdust wetted with it. If the sawdust thus moistened is left lying like a poultice over the cast all night, the paint may be washed away next morning with cold water. But it appears to us that the trouble and risk of this might be avoided by painting over the old colour—by giving it two coats of new paint, mixed with oil in the usual way, and a third of flat colour—*i.e.*, colour with very little oil and a good deal of turpentine. Painted casts look better dead than shining. Terra-cotta colour would be very suitable. Tube colour, bought at the artists'-colourman's, is the best, but it is the most expensive. Common tinned paint, to be bought at any oilman's or ironmonger's, would be quite sufficient for the two coats, tube colour being used with the turps for the flatting.—S. W.

Hardening Cold and Wood Chisels.—C. W. (*Kilburn*).—You have described the process of hardening and tempering correctly, and therefore the only thing to advise is to practise, varying the shades of colour until you get the right one. Let down and quench at a plum colour, and if that does not succeed, try shades between it and a straw. All steel is not alike, but qualities vary widely. Do not get it too hot either in the first place, or you will burn it so that it will not take a temper. There is no advantage in using oil for chisels; water will answer as well.—J.

III.—QUESTIONS SUBMITTED TO CORRESPONDENTS.

Drilling Square Holes.—A READER writes:—"I noticed in a paper, I think the *Railway Herald*, that the scientific method of drilling square holes has been found out, and patented in Austro-Hungary. Do any of your readers know of the same, and could explain it?"

Sharpening Carving Tools.—AMATEUR (*Stockport*) writes in reply to J. W. B. (see page 172):—"Will J. W. B. kindly tell me how tools should be ground, and oblige?"

Child's Wooden Toys.—W. A. (*Hanley*) writes:—"Can any correspondent inform me where I could purchase the above wholesale, or is there a book to be purchased on the manufacture of the above, if so, where and price?"

Ivory Walking Stick.—W. A. (*Hanley*) writes:—"Can any brother reader kindly suggest the best cement that will join broken ivory walking stick?"

Soap.—G. H. (*Manchester*) writes:—"In what manner is paraffin wax used with soap for washing, and what is the benefit?"

Joiners' Composition.—J. R. (*Oldham*) asks:—"Can any of your correspondents in 'Shop' tell me how to make a composition for filling up joints and crevices in wood?"

Convertible Furniture.—W. W. W. (*Nottingham*) writes:—"Will some experienced readers of WORK give me their modes (with sketch and few dimensions) for a suitable and convenient arrangement of constructing a neat and artistic convertible chair, which, when turned, can be made into library steps?"

IV.—QUESTIONS ANSWERED BY CORRESPONDENTS.

Pronged Rings.—Syer & Co. (75, *Chiswell Street*) write in reply to E. C. (*Battlemore*) (see page 190):—"Replying to your correspondent's inquiry *re* above, we should be glad to undertake the making of these for him."

Machine for Current of Air.—P. P. (*Withington*) writes in answer to BELLOWS (see page 190):—"He had better get two pairs of house bellows, and having screwed fast the handles to a large board (which will serve as a bell-plate or stand), connect the hinged handles to a double crank shaft, in such a manner that the bellows will alternately rise and fall, and thus if the nozzles are connected a continuous flow of air will be the result. I have the above arrangement under my bench (but without the shafting), and I work them with my feet direct. I use the wind for blowpipe work, and the result is a fairly steady blast. If BELLOWS wishes it for a forge, my advice is get a rotary blower; they are cheaper than smiths' bellows, in first cost, and last much longer. If he is an amateur, and has a small portable or other hearth, the above arrangement will act admirably."

Fretwork Patterns.—F. S. (*Dorchester*) writes:—"I am a constant and very grateful reader of WORK, and being anxious to 'do unto others as I should wish to be done unto' (in this case the helping out of a difficulty), if W. E. M. (who is making inquiries for a book of fretwork patterns) will send his address to me, also rough sketch of frame, I will send him the covers of a book I have by me, and address where to send for it. By description of frame, etc., I fancy I have the identical book."—[I insert your reply to W. E. M., but it will be unnecessary for him to avail himself of your kind offer owing to replies on this subject from other writers.—ED.]

French Polishing.—C. S. (*Radford*) writes in reply to T. A. (*Belfast*) (see page 174):—"I think the reason why your polishing goes dull after a time is that you use too much oil. I only use just enough oil to prevent the polish from sticking to the wood by applying a little on my finger to the pad. If you try that you will find a difference."

French Polishing.—R. H. (*Lewisham*) writes in reply to T. A. (*Belfast*) (see page 174):—"As regards French polishing fretwork, perhaps the following hints may prevent the excess of oil from spoiling his work in the future. After dipping the wad of wool, with its covering of rag, into the oil, apply a little French polish, and rub well in, but do not attempt to polish. After applying what you consider sufficient, put the work aside in a warm room for a few days. When you begin to polish use white polish at first; no oil at all if the wood appears greasy; change the rag each time fresh polish is put on to the wad of wool; when a fair polish appears then use French polish; when the polish is perfect, finish off with fresh wad of wool and rag, and a small quantity of spirits of wine, rubbing lightly. This will clear off all oil, and leave a first-rate surface, if only small drops of oil have been used during the polishing process. Always polish in a warm room, one with a good fire in it, and thoroughly dry and air the linen rags; put small quantities of polish on the wads of wool, very little oil, and make the circular strokes cover a fair space each time, rubbing the way of the grain only at the finish each time. If you carefully follow this advice I think you will be as successful as myself, since I had them given to me."

Wood Colouring.—W. G. (*Southport*) writes in reply to OX GALL (see page 174):—"That he will find the following answer his purpose for staining deal a dark oak colour: Two pennyworth of vandyke in oil, one-eighth of a pint of terebine, ditto of turpentine, and one fourth of a pint of kerosine or paraffin oil. Mix well, and try on a piece of planed deal, first laying it on thinly with a piece of sponge or old felt. If too dark, add more paraffin, again experimenting until the desired colour is obtained. After staining the overmantel, rub well with a piece of old woollen cloth or felt, then give a coat of French polish, using a wadding rubber. Finish with beeswax and turpentine, well rubbed with a soft, dry cloth. This will simulate the colour and dull polish desired, with as little labour as any process that I know of. Permit me to add, for the information of other readers of WORK, that this stain may be brightened by using more or less of raw sienna, also ground in oil, instead of all vandyke, thinning as required with paraffin oil. I use it largely for trade purposes, being cheap, easily and quickly applied, has a nice appearance, and leaves the work with a smooth surface ready for polishing or varnishing. And speaking of varnishing here is another wrinkle from my own practice. Before varnishing plain wood, either stained or unstained, the article must be well sized, or the varnish will sink in. Ordinarily glue or gelatine size is used. My plan is to give two thin coats of French polish laid on with a brush; when dry rub down with fine, worn glass paper, finishing with a coat of good oak varnish. This beats anything I have yet seen used."

Elizabethan Twist in Lathe.—W. P. W. (*Newport, Mon.*) writes in reply to C. C. E. (see page 109):—"I am not quite clear as to the word 'Elizabethan,' but if C. C. E. means any spiral having a convex contour—a piece of rope for instance—he is quite mistaken, it can easily be done in the lathe. I have a 4½-in. screw-cutting lathe of ordinary type, in which I have done several pieces of spiral work, and could do it in any such lathe with overhead gear, without the aid of rasp or file. If C. C. E. would wish I will send him a specimen finished by cutter only."

Refrigerator.—C. H. W. (*Hampstead*) writes in reply to URGENT (see page 174):—"A refrigerator is constructed as follows: First an inside case of ½-in. or ¾-in. deal lined with not less than No. 12 zinc; this case is covered outside with felt; a space is left between this and the outside case that can be made of inch stuff, usually with two lids or doors of cabinet pattern. On the inside lid the zinc is raised, and the space thus formed is filled with cork dust. Ventilation is made through inside case near the top, to carry off warm air that would condense and drop on contents of cupboards. I have made several, and the last one something of the pattern URGENT wants. It was used as a counter, etc., in the ice cream trade, and pronounced by Gatti's men the best on their round to keep ice. The place to store the ice was at the top, and water from same trickled down sides of cupboards in centre, into a sort of trough, and through pipe in floor, to drain. There is a lot of work in making one, and they would come expensive. I will send plans with Editor's permission."—[By all means send plans.]

Trade Notes and Memoranda.

MR. FRANKS, of the British Museum, recently secured from the gravemounds and dolmens of Japan a splendid collection of old pottery, iron weapons, and copper ornaments. The pottery is very curious, and the collection, as a whole, is unique.

A MR. ANDERSON, of Leeds, has invented a system of ventilation for the underground railways, which is, at least, ingenious. He proposes to discharge the noxious fumes from the locomotives into a long exhausting flue placed between the rails. A long sliding box underneath the locomotive receives the vapours from the smoke box, and transmits them to the flue. The sliding box travels over the flue fitted with suitable valves, which are opened by the sliding box in its passage, the valves being of such a length that a second valve is covered by the sliding box before it has quite passed over the previous one. The flue is exhausted by fans stationed at intervals along the line, and driven by stationary engines. The fan being set to work, and the train started, as the engine passes over the valves in succession, the steam and products of combustion are sucked from the engine through the valves in the exhausting flue, and are drawn from it and discharged through suitable shafts into the atmosphere. The difficulties which we should apprehend here would, however, be of a mechanical nature, due to the great difficulty of making the apparatus sufficiently free from leakage.

A RELIC of the iron age has been found at Nötterö, on the Christiania Fjord, in Norway. It consists of an iron pot with handles, a sword 2 ft. 6 in. long, an anvil, and a pair of smith's tongs, together with some bones. The mound in which it was discovered is now 300 yards inland, and was believed at one time to be close to the sea.

A SAN FRANCISCO journal contains an account of the discovery of a new method of preserving ironwork from rust. It consists in brushing it over with a thin wash of turpentine and white lead, a thin compound which will penetrate into the very interstices of the metal, which the thicker oil paint is unable to do. No corrosive action or scaling can then take place. Mr. Heald, the discoverer, is said to have been led to this result by observing that some old gasholder plates which were badly corroded still retained the "shipping marks" in a state of perfect preservation.

WORK

is published at La Belle Sauvage, Ludgate Hill, London, at 9 o'clock every Wednesday morning, and should be obtainable everywhere throughout the United Kingdom on Friday at the latest.

TERMS OF SUBSCRIPTION.

3 months, free by post	..	..	1s. 8d.
6 months, "	..	..	3s. 3d.
12 months, "	..	..	6s. 6d.

Postal Orders or Post Office Orders payable at the General Post Office, London, to CASSELL and COMPANY, Limited.

TERMS FOR THE INSERTION OF ADVERTISEMENTS IN EACH WEEKLY ISSUE.

	£	s.	d.
One Page	12	0	0
Half Page	6	10	0
Quarter Page	3	12	6
Eighth of a Page	1	17	6
One-Sixteenth of a Page	1	0	0
In Column, per inch	0	10	0

Prominent Positions, or a series of insertions, by special arrangement.

Small prepaid Advertisements, such as Situations Wanted, Exchange, etc., Twenty Words or less, One Shilling, and One Penny per Word extra if over Twenty.

*** Advertisements should reach the Office fourteen days in advance of the date of issue.

Your Name, Sir?—A complete Font of Rubber Type, consisting of two alphabets, with box, ink, pad, and holder, post free, 1s. 6d.; extra alphabets, 6d. per set.—E. C. PRESTRIDGE, Manufacturer, Cumberland Street, Bristol. [6 R

The "Era" Pocket Printer, Regd., prints anything; supersedes stencils; post free, 1s. 6d.—F. BOWDITCH, 5, Waldo Road, Kensal Green, London. [9 R

Hats Made Easy. Braces made perfect. Fits all sizes, hats or braces. 6 stamps.—T. RAWSON, Heaton Lane, Stockport. [2 R

Cyclists.—Use "Graphine" on your chains; no grease, will not hold dust; 8 stamps, free.—WOLFF and SON, Falcon Pencil Works, Battersea, S.W. [1 R

The Arcundian Oak Grainer, works seven different figures, 5s.—G. JONES, Decorator to Her Majesty, East Cowes, Isle of Wight. [1 S

Decorators.—Superior cut Stencils. Choice selected parcel. 100 ready for use, £1. Sample dozen, 2s., free.—G. JONES, East Cowes. [2 S

Stencils, 200, working size, choice selected designs, uncut, 5s.—G. JONES, East Cowes, Stencil Cutter to the leading decorative firms. [3 S

Patterns.—100 Fretwork, 100 Repoussé, 200 Turning, 300 Stencils, 1s. each parcel. Catalogue, 700 Engravings, 3d.—COLLINS, Summerlay's Place, Bath. [7 R

Stencils, 100, working size, ready for cutting, 5s., free. Samples free. 1 dozen cut Stencils, 2s.—COLLINS, Summerlay's Place, Bath. [8 R

Dynamo and Motor Castings, Manchester or Gramme type, 10- to 500-candle. Price list for stamp.—ALFRED CROFTS, Electrician, Dover. [4 *

The Works Magazine Reprint Project (-) 2012 toolsforworkingwood.com

RD. MELHUISH & SONS,

FETTER LANE, LONDON, E.C.

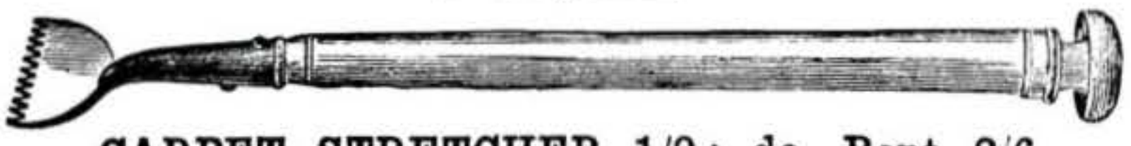
Prize Medal for excellence of

TAPS & DIES · VISES · TWIST DRILLS · CHUCKS · MACHINE SCREWS · LATHES · FILES · STEEL & TOOLS · STUBS

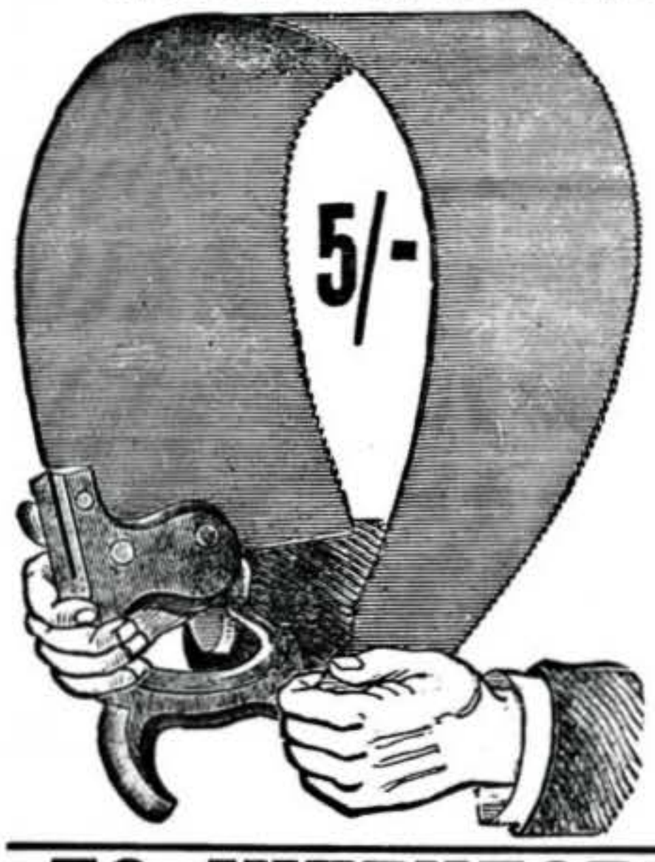
TOOLS

For all Workers in Metals, also Joiners, Wood Carvers, etc.

WE HOLD THE MOST COMPLETE STOCK IN THIS COUNTRY.



CARPET STRETCHER, 1/9; do., Bent, 2/6.



Our Saws, made from Extra Cast Steel, specially for the purpose, tempered and ground by machinery, acccurately tapered from tooth to back, and from heel to point, will work easy, with least possible "sett."

OUR FAMOUS

HAND-SAWS,

As ILLUSTRATION,

16 in.	20 in.	24 in.	26 in.
3/6	4/-	4/9	5/-

BRASS BACK TENON do.

8 in.	10 in.	12 in.	14 in.
3/9	4/-	4/6	5/3

All Carriage Free.

Our Tools cannot be excelled.

See Quality, also Price.

RD. MELHUISH & SONS,

85—87, FETTER LANE, LONDON.

SCIENTIFIC & ELECTRICAL MATERIALS.

IMMENSE STOCK of Appliances and Materials for Construction of **Electric, Optical,** and **Scientific Apparatus.**

ELECTRIC BELLS, INDICATORS, WIRES, TERMINALS, CARBONS, BATTERIES LENSES, AND FITTINGS.

Electric Catalogue, 100 pages, 4 stamps

H. DALE & CO., LTD., 26, LUDGATE HILL, LONDON, E.C.

(HENRY J. DALE, Manager.)

Specialty for Photographic Cameras, Lenses, Stands, Sensitised Paper and Dry Plates. New Patent Aneroid Barometers and Thermometers. Electric Light. Every New Invention or Appliance. **Buy of the Actual Manufacturers,** and get full Scientific Knowledge, and **Save** all Intermediate Profits. Send for ILLUSTRATED CATALOGUES of any branch of SCIENCE—A GUIDE TO BUYERS.—**DALE, 26, LUDGATE HILL, E.C.**

PICTURE FRAME MAKING.

FOURTH EDITION, Enlarged and Revised.

THE FRAME MAKER'S INSTRUCTION BOOK.

150 Diagrams, Designs, and Patterns.

Instructions in Joining, Fitting, Mount Cutting, &c. Also Prices of Mouldings, and every Requisite for the Trade. Post Free, **6 Stamps.**

GEO. REES, 115, Strand (Corner of Savoy St.);

Moulding Dept., 41, 42, 43, Russell St., Covent Garden, London.

PATENTS,

DESIGNS, AND TRADE MARKS.

TEL. ADDRESS: APPLICANT, London.

BERNHARD DUKES,

226, High Holborn, London, W.C.,

ATTENDS TO ALL BUSINESS RELATING TO

PATENTS, DESIGNS, and TRADE MARKS.

ATTENDANCE IN THE PROVINCES. *Please mention this Paper when applying.*

MANUALS OF TECHNOLOGY.

Edited by Prof. AYRTON, F.R.S., and RICHARD WORMELL, D.Sc., M.A. With Numerous ILLUSTRATIONS and DIAGRAMS.

The Dyeing of Textile Fabrics. By J. J. HUMMEL, F.C.S. *Third Edition.* 5s.

Steel and Iron. By WILLIAM HENRY GREENWOOD, F.C.S., M.I.M.E., &c. *Third Edition.* 5s.

Spinning Woollen and Worsted. By W. S. BRIGHT MCLAREN, M.P. *Second Edition.* 4s. 6d.

Cutting Tools. By Prof. R. H. SMITH. *Second Edition.* 5s. 6d.

Practical Mechanics. By J. PERRY, M.E. *Third Edition.* 3s. 6d.

Design in Textile Fabrics. By T. R. ASHENHURST. *Third Edition.* 4s. 6d.

Watch and Clock Making. By D. GLASGOW. 4s. 6d.

CASSELL & COMPANY, LIMITED, *Ludgate Hill, London.*

TO INVENTORS.

If you have an idea for an invention **PATENT** it for a trifling cost. Particulars and Pamphlet free.

RAYNOR & CASSELL, Patent Agents.

37, CHANCERY LANE, LONDON, E.C.

ESTABLISHED 1851.

BIRKBECK BANK,

Southampton Buildings, Chancery Lane, London.

THREE per CENT. INTEREST allowed on DEPOSITS, repayable on demand.

TWO per CENT. INTEREST on CURRENT ACCOUNTS calculated on the minimum monthly balances, when not drawn below £100.

STOCKS, SHARES, and ANNUITIES Purchased and Sold.

HOW TO PURCHASE A HOUSE FOR TWO GUINEAS PER MONTH or A PLOT OF LAND FOR FIVE SHILLINGS PER MONTH, with immediate possession. Apply at the Office of the BIRKBECK FREEHOLD LAND SOCIETY, as above.

The BIRKBECK ALMANACK, with full particulars, post free on application.

FRANCIS RAVENSCROFT, Manager.

LENSES, SHUTTERS, TRIPODS, &c.

HUMPHRIES' CAMERAS, 1889.

THE DRAYTON.—Most compact. Every movement best workmanship. Highly finished; low price. Illustrated Lists free.—W. H. HUMPHRIES, Photographic Apparatus Manufacturer, 116, Highbury Hill, London, N. Factory, 70, Elfort Road, Drayton Park, N.

NOTICE.

CASSELL'S CLASSIFIED CATALOGUE, containing particulars of upwards of **One Thousand Volumes** published by Messrs. CASSELL AND COMPANY, ranging in price from

THREEPENCE to TWENTY-FIVE GUINEAS,

will be sent on request *post free to any address.*

CASSELL & COMPANY, LIMITED, *Ludgate Hill, London.*

A PURE AND PERFECT ARTICLE FOR

Teeth, Gums, & Breath.

PURILINE

REGISTERED

TOOTH-POLISH.

"PURILINE" will Purify and Beautify the Teeth with a Pearly Whiteness; Polish the Enamel; Prevent Tartar; Destroy all living Germs; and keep the mouth in a delicious condition of Comfort, Health, Purity, and Fragrance. Non-gritty and Absolutely Pure and Harmless to use.

Price One Shilling, in Handsome Enamel Box.

Of all Chemists, Perfumers, &c. Post free by

Proprietor: A. WILSON, 422, Clapham Road, London, S.W.

J. H. SKINNER & CO., EAST DEREHAM, NORFOLK,

Manufacturers and Importers of Photographic Apparatus and Fretwork Materials.

Timber Yards, Sawing and Planing Mills covering about Two Acres near Railway Station.

J. H. S. & CO. have now a large Factory with accommodation for upwards of 100 workmen, which is used exclusively for the manufacture of Photographic Apparatus of every description, from the cheapest to the most expensive.

The process is simplicity itself. Full Instructions supplied with each set.

3/6 The Eclipse Camera Set. 3/6

Complete, consisting of a Polished Mahogany Sliding Bellows, ¼-plate Camera to photograph full-size carte-de-visites, with Focussing Screen, Dark Slide, Brass-mounted Lens, Brass Fittings, Developing and Fixing Solutions, Packet of Dry Plates, and full Instructions, enabling any amateur to take a good Photograph. Price **3s. 6d.**, or securely packed by Parcel Post, **4s.**

7/6 Complete Photographic Outfit. 7/6

Comprising ECLIPSE CAMERA SET, as above; also PHOTOGRAPHIC PRINTING APPARATUS, consisting of Hardwood Printing Frame, with Brass Spring Back, Sensitised Albumenised Paper, Gold Toning Solution, Fixing Solution, Glass Rods, Cards for Mounting, with complete Instructions. Also Hardwood Folding Tripod Stand and Focussing Cloth. Price **7s. 6d.** Securely packed, post free, **8s. 6d.** If packed in portable wood case, with hinged lid and leather strap, as in illustration, 9d. extra.

Every Set is carefully examined before being sent out, and guaranteed to be in working order.

N.B.—If Apparatus does not give satisfaction, and is returned uninjured within three days of receipt, we guarantee to refund purchase money.

Better Sets, 10s. 6d., 21s., 42s., 100s., and upwards. Complete Catalogue of Photographic Apparatus, one stamp. **J. H. SKINNER & CO., EAST DEREHAM, NORFOLK.**

Wholesale Agent for London—J. MOTHERSILL, 60, Holloway Road, N., and 6, Southampton Row, where Samples may be seen.

J. H. S. & CO. keep regularly in stock about **120,000 FEET OF FRETWOOD,** solid and 3-ply, veneers, &c., besides a very large quantity of Logs, Planks, and Boards, Carving and Turning Wood, &c., and **200,000 FULL-SIZE DESIGNS for Fretwork, Wood Carving, &c.,** besides an immense Stock of Joiners' Tool Chests, Fretwork Outfits, Drills, Saw Frames, Hand and Treadle Machines, Saw Blades, &c. &c.

Specialities for 1888 & 1889.—Books of New Designs. FRETWORK No. 1, containing 12 Large Sheets, price 1s. No. 2, containing 20 Sheets of larger and more elaborate Patterns, 2s. 6d. Book of Wood Carving Designs, containing 14 Patterns, price 1s.; these are all New Patterns, not sold in any other form, and would, if sold separately, cost three or four times the amount charged. Fretworker's Handbook and Workshop Guide, price 1s. New Designs. All Patterns greatly reduced in price.

Complete Fretwork Outfit, comprising 12-inch Steel Frame, 48 Saws, Awl, File, 4 Designs (with sufficient planed Wood, gratis), and 1s. Handbook on Fretwork, price 3s. 6d., carriage paid. 12 feet Assorted Planed Fretwood, 3s. 6d.

☞ Special Fretwork Design, in commemoration of Her Majesty's Jubilee, size, 36 in. by 26 in., price 2s. 6d.

Catalogue of Machines, Designs, Wood, Tools, &c., with several Hundred Illustrations, and full Instructions for Fret-cutting, Polishing, and Varnishing, price 4d., post free. Good Fret Saws, 1s. 6d. per gross; best ditto, 2s. per gross.

Eclipse Design, No. 102.

Wall Bracket. Price 5d.

NOTICE TO INVALIDS.

Men and women in search of Health, Strength, and Energy, should know that **HARNESS' ELECTROPATHIC BELT** will strengthen every nerve and muscle of the body.
It is also unquestionably the best known Cure for **Rheumatic and Nervous Affections, Liver and Kidney Diseases, Ladies' Ailments,** &c.

HARNESS' ELECTROPATHIC BELT

Assists the Digestion, promotes the Circulation, stimulates the organic action, and imparts *NEW LIFE and VIGOUR* to the Debilitated Constitution.

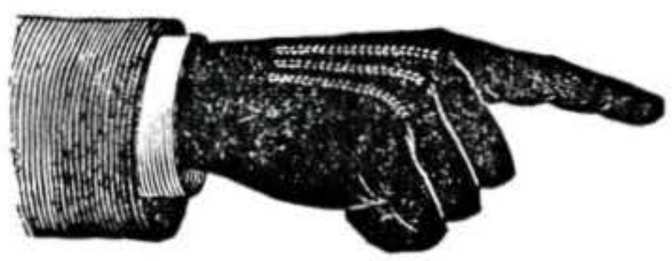
BOOK of TESTIMONIALS, Descriptive Pamphlet, and Advice, free of charge on application to

The MEDICAL BATTERY CO., LTD., 52, Oxford St., London, W.

Guaranteed Genuine.

Our readers are invited to call and personally inspect the Belts before purchasing. NOTE ONLY ADDRESS AS ABOVE. (*Corner of Rathbone Place.*)

TO READERS OF "WORK."



NOTICE!!

You are invited to call at our London Show Rooms, **100, HOUNDSDITCH,**

Two Minutes' Walk from the Great Eastern Terminus, Liverpool Street, London.

☞ *PLEASE MARK THIS ADDRESS ON YOUR CATALOGUE.*

Amateurs are invited to call and see BALCK'S PATENT LATHE PLANER, BROWN'S IMPROVED SLIDE REST, NEW PATENT MILLING APPLIANCE for Cutting Slots, Hexagon Nuts, and Novelties noticed in "Work."

Send Six Stamps for Catalogue of Lathes and Parts; or Two Stamps for List of Second-hand Lathes by Holtzappfel and others.
We supply Lathes and Tools on Easy Terms. Hire Purchase System.

ALL LETTERS TO **BRITANNIA COMPANY, COLCHESTER,**
MAKERS OF ENGINEERS' TOOLS TO THE BRITISH GOVERNMENT.

FRETWORK & CARVING.

Highest Award—Gold Medal for Tools and Patterns.

MACHINES, DESIGNS, TOOLS, WOOD, MIRRORS, HINGES and FITTINGS, VARNISH, &c.

Fret-saw Outfit on card, with Instructions, 2s. 6d., free.
Set of 12 best Carving Tools, with boxwood handles, ready for use, price 9s., free.
If you want good Designs, and are competing for exhibition, try ours, for which we receive testimonials daily.
☞ See our complete Catalogue, 64 pages, quarto, containing the best variety of designs published, free for 6 stamps. [22

HARGER BROS., SETTLE.

"THE AMATEUR." A Paper for Fretworkers, Carvers, Inlayers, Wood Painters, &c.

6d. MONTHLY.

No. 762.

Gold Medals Awarded to our Subscribers.

CATALOGUE of Artistic Fretwork, Carving, Inlaying and Wood-painting Designs, Mouldings, Cabinet Fittings, Fancy Woods, Tools (Star and Griffin's Fretsaws), Machines, Clockworks, Varnishes, Stains, Polishes, and every other requisite, with 900 Engravings. 6d., free.

No. 762. Rack for Thermometer, Grecian Easel, Photo Frame, and Rack for Hat and Coat Hooks, at 3d., free.

HENRY ZILLES & CO., Publishers of "THE AMATEUR,"
26 & 24, WILSON STREET, FINSBURY, LONDON, E.C.

MELLIN'S FOOD

For Infants and Invalids.

TRADE MARK

NOT FARINACEOUS. Rich in Flesh, Nerve, Brain, and Bone Formers.

IT is a fact that farinaceous foods cannot be digested by Infants. This **is the only food** in which the starch has been wholly changed **into soluble substances,** which can at once be converted in the body into **living blood.** This remarkable result is attained outside the body, by imitating exactly, in the process of manufacture, the natural conditions of healthy and perfect digestion.

MELLIN'S FOOD has been examined physiologically by the highest Medical Authorities, and tested chemically by the most distinguished Analysts, and has always been classed by them A 1. It has gained many awards of the highest merit at Public Exhibitions.

No Food in the market can show such a vast collection of *bonâ-fide* testimonials, and many of these allude in an emotional yet sincere manner to the fact that **"MELLIN'S FOOD has saved Baby from Death."**

USED IN ALL CHILDREN'S HOSPITALS.

Prospectus, Pamphlet and Sample, post free on application to the Inventor and Manufacturer,

G. MELLIN, Marlborough Works, Stafford St., Peckham, London, S.E.

ASPINALL'S ENAMEL.

COLOURS—EXQUISITE. SURFACE—LIKE PORCELAIN.

Testimonials from the Queen of Sweden, the Marchioness of Salisbury, &c.

FOR ALL SURFACES OF WICKER, WOOD, METAL, GLASS, EARTHENWARE, CHINA, &c.

"Simply Perfection."—*The Queen.*

Made in over 100 Colours. Sold in Tins, 4½d., 1s. 3d., and 2s. 6d. For Baths (to resist Hot Water), 1s. 6d. and 3s. Post free, 7d., 1s. 6d., 3s.; 1s. 9d. and 3s. 6d.

READY FOR USE. A CHILD CAN APPLY IT.

SOLD EVERYWHERE.

ASPINALL'S ENAMEL WORKS, LONDON, S.E.

Telegrams—EDWARD ASPINALL, LONDON. COLOUR CARDS FREE.

PRINTED AND PUBLISHED BY CASSELL & COMPANY, LIMITED, LA BELLE SAUVAGE, LONDON, E.C.

The Works Magazine Reprint Project (-) 2012 toolsforworkingwood.com